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No. 68



COASTS AND ISLANDS  
OF THE  
MEDITERRANEAN SEA

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PART 4

*With the compliments of the United States  
Hydrographic Office .*

**J. R. Bartlett, Commander U.S. Navy.**

**Hydrographer to the Bureau of Navigation .**

**Washington, D.C.**

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## COASTS AND ISLANDS

OF THE

# MEDITERRANEAN SEA.

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## PART IV.

THE GULF OF GIOJA TO CAPE SANTA MARIA DI LEUCA, SOUTH  
COAST OF ITALY, THE ADRIATIC SEA, IONIAN ISLANDS,  
THE COASTS OF ALBANIA AND GREECE TO  
CAPE MALEA, WITH CERIGO ISLAND.

INCLUDING

THE GULFS OF PATRAS AND CORINTH.

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COMPILED FROM VARIOUS SOURCES

BY

LIEUTENANT JOHN M. HAWLEY, U. S. NAVY.

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The principal authorities used in the compilation of this volume are: *Mediterranean Pilot*, Volume III, 1882, edited by Commander James Penn, R. N., and issued by the Hydrographic Office, Admiralty, London; Lippincott's and Johnston's Gazetteers; American Encyclopedia; Nouveau Dictionnaire de Géographie Universelle, par M. Vivier de Saint Martin, Paris; Notices to Mariners and Hydrographic Notices, published by the United States Hydrographic Office; late charts and reports received from English, French, Spanish, and Italian authorities.

J. R. BARTLETT,  
*Commander, U. S. Navy.*

U. S. HYDROGRAPHIC OFFICE,  
*Washington, D. C. July 1, 1883.*

## NOTICE.

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All bearings are *true*, except when otherwise stated.

The direction of the wind is the point from which it blows; that of the current, the point to which it is setting.

Distances are expressed in yards and miles.

Longitudes are from the meridian of Greenwich.

# LIST OF WORDS OF FREQUENT OCCURRENCE IN MAPS, CHARTS, AND SAILING DIRECTIONS, OF THE ADRIATIC.

ITALIAN.	ENGLISH.
Acqua .....	Water.
Albero .....	Tree, mast.
Allerta! .....	Look out!
Alto, a .....	High, lofty.
Ancoraggio .....	Anchorage.
Arena .....	Sand.
Argilla .....	Clay.
Baia .....	Bay.
Barra .....	Bar.
Bianco, a .....	White.
Braccio di 6 piedi ..	Fathom.
Burrasca .....	Squall.
Cala .....	Cove, creek.
Campanile .....	Belfry, tower.
Canale .....	Canal, channel.
Capo .....	Cape, headland.
Carbone fossile .....	Coal.
Chiesa .....	Church.
Città .....	City.
Colle .....	Hill.
Corpo di guardia ....	Guard-house.
Corrente .....	Current.
Corto, a .....	Short.
Costa .....	Coast, shore.
Di dentro .....	Within, inner.
Di fuori .....	Without, outer.
Dogana .....	Custom-house.
Erto, a .....	Steep.
Fango .....	Mud.
Faro, fanale .....	Light-house.
Ferro .....	Iron.
Ferro-via .....	Railroad.
Fisso, a .....	Fixed.
Fiume .....	River, stream.
Fondo .....	Deep, bottom.

ITALIAN.	ENGLISH.
Foresta .....	Forest.
Forte, fortezza ....	Fort, fortress.
Fuoco .....	Fire, litgh.
Gavitello .....	Buoy.
Ghiaccio .....	Ice.
Ghiaja .....	Gravel.
Girante .....	Revolving.
Golfo .....	Gulf.
Grande, gran .....	Great.
Guado .....	Ford.
Guardiano .....	Health officer.
Imboccatura .....	Mouth of a river.
Isola .....	Island.
Istmo .....	Isthmus.
Lago, laguna .....	Lake, lagoon.
Largo, a .....	Wide, broad.
Lume .....	Light.
— fisso .....	Fixed light.
— a folgori .....	Flashing light.
— girante .....	Revolving light.
Luna .....	Moon.
Lungo, a .....	Long.
Mare .....	Sea.
Marea .....	Tide.
Mercato .....	Market place.
Molo .....	Mole, pier, jetty.
Monte, montagna ...	Hill, mountain.
Mulino .....	Mill.
Muro .....	Wall.
Nero, a .....	Black.
Nuovo, a .....	New.
Palude .....	Marsh, bog.
Passo .....	Pass, channel.
Piano, a .....	Flat, level, low.



# **VI LIST OF WORDS OF FREQUENT OCCURRENCE IN MAPS, ETC.**

ITALIAN.	ENGLISH.	ITALIAN.	ENGLISH.
Pianura .....	Plain.	Sasso .....	Stone.
Piccolo, a .....	Little, small.	Scala .....	Landing-place.
Pietra .....	Stone, rock.	Scandaglio .....	Sounding-lead.
Piloto .....	Pilot.	Scogliera .....	Reef of rocks.
Pioggia .....	Rain.	Scoglio .....	Shoal, rock.
Ponte .....	Bridge.	Secca .....	Shoal, bank.
Porta .....	Gate of a town.	Segnale .....	Beacon, signal.
Porto .....	Port, harbor.	Selva .....	Forest.
Posta delle lettere...	Post-office.	Sorgente .....	Spring.
Posto .....	Post, station.	Stagione .....	Season, station.
Promontorio .....	Promontory.	Strada .....	Road, street.
Punta .....	Point.	Stretto .....	Strait, narrow.
Rada .....	Roadstead.	Terra .....	Land.
Rio .....	River, channel.	Torre .....	Tower.
Riva .....	Shore, coast.	Valle .....	Valley.
Rosso, a .....	Red.	Vecchio .....	Old, ancient.
Sabbia .....	Sand.	Vento .....	Wind.
Santo, a .....	Saint, holy.	Verde ....	Green.
Sale .....	Salt.	Villaggio .....	Village.
Saline .....	Salt-works.	Volcano .....	Volcano.
Sanità .....	Health.		

## **THE POINTS OF THE COMPASS.**

ITALIAN.	ENGLISH.	ITALIAN.	ENGLISH.
Tramontana .....	N.	Mezzodì .....	S.
Greco tramontana...	NNE.	Mezzodì libeccio ...	SSW.
Greco .....	NE.	Libeccio .....	SW.
Greco levante .....	ENE.	Ponente libeccio ...	WSW.
Levante .....	E.	Ponente .....	W.
Sirocco levante ....	ESE.	Ponente maestro ...	WNW.
Sirocco .....	SE.	Maestro .....	NW.
Mezzodì sirocco .....	SSE.	Maestro tramontana.	NNW.

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# COASTS AND ISLANDS OF THE MEDITERRANEAN.

## CHAPTER I.

### GULF OF GIOJA TO CAPE SANTA MARIA DI LEUCA, SOUTH COAST OF ITALY.

VARIATION IN 1883: Gulf of Gioja,  $10^{\circ} 30'$  W.; Cape Santa Maria di Leuca,  $8^{\circ} 34'$  W.

**The GULF OF GIOJA** is formed between the shore southward of cape Vaticano and the N. shore of Sicily, eastward of cape Rassaculmo; at its head is the northern entrance to the strait of Messina.

From cape Vaticano the coast southward is high and fronted by cliffs for a distance of seven miles. Nicotera, a large village, stands on the slopes of mount Poro  $1\frac{1}{2}$  miles from the shore. Thence a sandy beach trends S.  $\frac{3}{4}$  W. for upwards of eight miles, on the southern part of which is the village and tower of Gioja. Within this low shore is an extensive plain, through which flows the Mesima river; there is a depth of 10 fathoms at half a mile from this beach. The coast again increases in height with a cliffy shore, and thus it continues for eight miles to the town of Bagnara (built over the ancient *Portus Balarus*), which contained in 1871, 8,597 inhabitants. Westward of the town is a sandy bay a mile in extent, whence cliffs extend  $3\frac{1}{2}$  miles to the town and castle of Scilla.

**SCILLA** (ancient *Scylla*), the castle of which stands on a rocky bluff 223 feet above the sea, rises in terraces from the sandy bays on both sides of the bluff; it contains many fine buildings and several fountains, but the streets are narrow and steep.

The population is about 8,000. There are silk manufactories (mulberry trees abounding in the district), and good wines are produced. From July to September sword fish are caught in large numbers.

The land along this part of the coast rises to a considerable elevation and is scored by deep ravines, chiefly the channels of mountain torrents, and in many places is thickly wooded. Monte Alto, about 11 miles SE. of Scilla, is 4,232 feet above the sea.

**Dangers.**—A rock, above water, lies about 100 yards NE.  $\frac{3}{4}$  N. from the foot of the bluff, another lies about half a mile to the westward at



about 200 yards from the shore. There is deep water inside both these rocks. Outside them the bottom, which is composed of sand, gravel, and rocky patches, is very uneven, but at one quarter of a mile from the shore is a depth of 100 fathoms. NNW.  $\frac{3}{4}$  W., 600 yards from the bluff is a heavy tide-rip.

**ANCHORAGE.**—Temporary anchorage may be had off the marina of Scilla in from 12 to 16 fathoms (sand) 300 yards from the shore.

**The COAST.**—From the western bay of Scilla the clifly coast trends WSW.  $\frac{1}{4}$  W.  $1\frac{1}{2}$  miles to the point and tower of Cavallo. The bay is about half a mile in extent; on the western shore a little within the point is the chapel of the Madonna della Gracia, and a little farther to the westward is a small fort; over Cavallo tower is a telegraph.

**Pezzo Point.**—From Cavallo point the coast runs nearly in the same direction for  $2\frac{1}{2}$  miles to the low point of Pezzo; it retains its clifly character as far as the fort on the E. bank of the Alta fiumara, thence the remaining two miles is a sandy shore, cultivated within, and bordered by numerous houses, including the village of Cannitello with its church and detached belfry.

Cannitello is one of the termini of the telegraph cable which crosses the strait of Messina between Sicily and Italy.

At Pezzo point is a battery, and on the heights within are the chapel and telegraph of Piale, and to the eastward the ruined tower of Pezzo.

There are a few rocks off the eastern shore and the mouth of the fiumara; it is otherwise bold all along, there being from 20 to 30 fathoms at 200 yards from the shore.

One quarter of a mile off the point is a heavy tide-rip, and another occurs at  $1\frac{1}{2}$  miles to the eastward.

**REGGIO** (ancient *Rhegium Julii*), the only town of importance in the district, stands on the beach seven miles S.  $\frac{1}{4}$  W. of Pezzo point; it is well built, broad streets running parallel with the spacious marina which fronts the shore. The town, which contains about 31,000 inhabitants, has a handsome cathedral, several churches and convents, a college, hospital, and several fountains; on the shore S. of the town is a fort. Northward of Reggio is a sandy bay nearly  $3\frac{1}{2}$  miles long; it is rendered remarkable by the frequent appearance of the optical phenomenon named Fata Morgana.

Silk, gloves, and stockings are manufactured here, and there is an export trade in wines, olives, oil, and fruit, the produce of the neighborhood.

**LIGHT.**—From the belfry of the church of Santa Maria, Reggio, a fixed white light is exhibited at an elevation of 76 feet above the sea, and is visible in clear weather from a distance of three miles, between the bearings of ENE.  $\frac{1}{4}$  E. and S. by W. through an arc of  $116^{\circ}$ .

**ANCHORAGE.**—Vessels anchor in the bay N. of Reggio, but the edge of the bank is so steep and the water so deep, even at a short distance out, that the anchorage is hardly available for strangers.

**CAPE DEL ARMI.**—From Reggio the coast continues low and sandy for  $8\frac{1}{2}$  miles to cape del Armi. At five miles from Reggio is cape Pellaro, a low point, N. of which is a sandy bay, where anchorage may be had in case of necessity; the same, however, may be said of this anchorage as of that off Reggio. A few rocks lie close off cape del Armi; they are conspicuous by their whiteness; there is, however, deep water close to the shore. On the cape is an electric-telegraph semaphore.

**LIGHT.**—On cape del Armi is a white octagonal building, from which, at an elevation of 312 feet, a fixed white light is exhibited, which is visible 11 miles.

**The COAST.**—About  $4\frac{1}{2}$  miles SE.  $\frac{3}{4}$  E. of cape del Armi is Monaca point, thence the general trend of the S. coast of Italy is E.  $\frac{1}{4}$  S.  $13\frac{1}{2}$  miles to cape Spartivento. The shores continue well cultivated, and between the many spurs falling from the mountain range of Aspromonte are several streams, the deep ravines or watercourses being in many places clothed with fine timber.

Melito, containing about 6,000 inhabitants, is the most southern town of Italy; it is situated on rising ground a short distance from the beach on the right bank of the fiumara di Melito,  $3\frac{1}{2}$  miles eastward of Monaca point. Above it is a telegraph station, and below towards Monaca point the straggling village of Porto Salvo.

About  $2\frac{1}{2}$  miles northward of Melito, on an elevation of 1,495 feet, is the small village of Pentadattilo; it is inclosed within the dilapidated walls of an ancient castle perched on a crag, accessible by steps cut in the rock. It is said to have derived its ancient name of *Pentodaotylus* from the peculiar resemblance of the peaks above it to the human hand. The Greek language is still much used in this and the neighboring mountain villages.

The shores along this coast are clear of danger, there being nearly 50 fathoms at 200 yards off.

Two miles eastward of Melito is the tower of Trinita or Salta, and along the shore between are a few cottages.

Five miles eastward of Trinita is the point and tower of Theodosia, off which are a cluster of rocks, with shoal water a little outside of them.

Between Trinita town and Theodosia point, and near the mouth of the Daria stream, is the Marina di Bova, the town being situated four or five miles inland and considerably elevated. The latter place was

one of the towns which suffered so severely from the earthquake of 1783.

Several rocks, both above and under water, lie along the shore to the next point  $2\frac{1}{2}$  miles distant, on which is the tower of Monza; midway is another tower.

About three miles inland, on the bank of a stream nearly two miles eastward of Theodosia point, is the village of Palizza, with the ruins of a castle upon the summit of a bare rock above it. A little to the eastward is another small village called Pietrapennata, on a hill surrounded by forests, and commanding an extensive view.

**CAPE SPARTIVENTO** (ancient *Herculeum prom.*) is the southern point of Italy; rocks and shoal water extend a short distance off, but at half a mile there are 12 fathoms. On the cape is an electric-telegraph semaphore.

**LIGHT.**—From a white tower on the summit of cape Spartivento, at an elevation of 210 feet above the sea, is exhibited a *fixed* white light varied every *minute* by a bright *flash*, which is visible in clear weather from a distance of 18 miles.

**The COAST** from cape Spartivento trends NE.  $\frac{3}{4}$  N. 42 miles to Stilo point; the land between falling back to the westward forms a bay five miles deep, with a low sandy beach, which, however, at a short distance inland, attains a considerable elevation. The shore should not be approached within a mile, and excepting with off-shore winds affords no sheltered anchorage.

Sperlonga tower stands on the beach four miles to the NE. of cape Spartivento;  $1\frac{1}{2}$  miles inland from the tower is the village of Brancalcione. Five miles to the NE. of the tower is cape Bruzzano (ancient *Zephyrii prom.*); on elevated ground three miles inland is the village of the same name. From Sperlonga tower northward to cape Bruzzano the shore is fringed with rocks, several of which appear above water, extending three-quarters of a mile from the beach; the Artalia rock, lying three-quarters of a mile SSE.  $\frac{1}{4}$  E. from the tower, is the most southern of these dangers.

Pugliano battery stands on the beach four miles northward of cape Bruzzano; inshore of it is the village of Bianco, and four miles beyond is the tower of Spinosa. Conolungo tower is five miles NE. of Spinosa tower, and on the ridge above are the towns of Ardore and St. Hilario in the midst of vines and fruit trees.

**Gerace.**—The tower and chapel of porto Salvo stand on the beach six miles NE.  $\frac{3}{4}$  N. of Conolungo tower, on rising ground,  $3\frac{1}{2}$  miles inshore of which is the town of Gerace. Originally this town was of great strength, but the earthquake of 1783 destroyed its citadel and

cathedral; the ruins of an ancient city lie scattered over an extent of two miles. Gerace has manufactories of silk and wine, and in the neighborhood are mineral springs.

• **La Roccella** (ancient *Romechium*) stands on the shore five miles NE. by E.  $\frac{3}{4}$  E. of porto Salvo tower. From la Roccella the coast gradually trends round to the northward to Stilo point, distant 11 miles; on the shore between are the towers of Camillare and S. Fili.

**GULF of SQUILLACE.**—Between Stilo point and cape Rizzuto, which bears about NE.  $\frac{3}{4}$  N., distant 34 miles, is a large indentation, about 15 miles deep, named the gulf of Squillace, the *Scylleticus Sinus* of the ancients; the shore, continuing low and sandy, trends northward for 24 miles to the Alessi river; thence it curves for 22 miles NE. by E.  $\frac{1}{4}$  E. to Leonardo tower and thence eight miles SE.  $\frac{3}{4}$  E. to cape Rizzuto.

Numerous towns and villages surround the shore, and the Apennine range approaches within five miles of the coast at the head of the bay; it then bends more to the northward, but again approaches the shore on the N.E. Numerous mountain streams and torrents flow into the gulf. Except off the N. shore there are few, if any, hidden dangers; there is a moderate depth of water along the coast, but it offers no shelter except from off shore winds (from W.  $\frac{3}{4}$  S. round by N. to NE.  $\frac{3}{4}$  N.)

Videra tower is about one mile westward of Stilo point, and two miles farther N. is Castellone tower. The Cerauni river is  $1\frac{1}{2}$  miles N. of Castellone; on its right bank, four miles from the entrance, is the town of Guardavalle. The neighboring valleys are thickly planted with olive groves.

**Ponzo point** is about seven miles northward of Castellone; off it are a few rocks, and on the shore half way between it and the Cerauni river are the tower and chapel of St. Antonio. Northward of Ponzo point the slopes of the hills are thickly studded with villages, and at  $7\frac{1}{2}$  miles from Ponzo is fort Paliporto.

**Squillace.**—Four miles northward from the fort is the sharp rocky point of Stallati, on which is the tower of Coscia; small bays are formed on both sides of the point into which run the streams of Grigio and Alessi, the latter on the N. side of the point, the southern bay is filled up with rocks. On a lofty rock on the S. side of the Alessi, three miles from its mouth, is the small town of Squillace (ancient *Scylacæum*), which gives its name to the gulf; the land in the neighborhood of Squillace is very bold and precipitous, but in places is richly cultivated; in the vicinity are several ancient remains. Near Squillace is the picturesque village of Stallati, and three miles S. the ruined monastery of Montauro.

**Catanzaro.**—Five miles to the NE. of the tower of Coscia is the Mar-

ina of Catanzara, at the mouth of the Corace river. The city, which is situated about four miles inland, is finely built on the slopes of a high hill, between the Alli and Corace rivers; it is the chief town of the district, the see of a bishop, and contains a population of about 16,000. Catanzaro possesses a cathedral, several churches, castle, palace, and a theater; also manufactories of silk, velvet, and woollen fabrics, and an active trade in agricultural produce. The country around is richly cultivated, producing large quantities of silk, and both olive and walnut oil.

**Le Castella.**—About 12 miles to the NE. of the Marina of Catanzaro is Croccia tower, the coast between being well cultivated and studded with farms and dwellings. Le Castella, a small fortified town, stands on a rocky point eight miles E.  $\frac{1}{2}$  N. easterly, of Croccia tower, the shore between forming a bay, at the head of which is St. Leonardo tower; off this tower rocks extend nearly half a mile. One mile S. by W.  $\frac{1}{4}$  W. of Le Castella point is a sunken rock, in the channel between which and the shore is a depth of six fathoms.

**CAPE RIZZUTO.**—From Le Castella a rocky coast composed of low cliffs extends to the S.E. to cape Rizzuto, distant six miles; the cape (ancient *Japygumtria*) is low, but the tower which stands on it may be seen from a considerable distance.

On the S.W. side several rocks extend some distance off shore. About ENE.  $\frac{3}{4}$  E.,  $1\frac{1}{2}$  miles from the cape, is a rock, on which is a depth of only two fathoms, with deep water around it.

**Cape Cimiti.**—From Rizzuto a low cliffy coast trends to the NE. for  $13\frac{1}{2}$  miles to cape Nau; midway is cape Cimiti, on which is a tower. One mile N. of the cape is a rock about 500 yards off shore.

**CAPE NAU, or COLONNE** (ancient *Lacinian prom.*) is a rocky point of moderate height, projecting to the eastward; on its extreme is a tower, and there is another a short distance westward of it. On the cape is a Doric column, 26 feet in height, the remains of the temple of Juno. On both sides of the cape are several rocks, and nearly a mile ESE.  $\frac{3}{4}$  E. of it is a sunken rock, with a channel of five fathoms between it and the shore; within two miles of the cape there is a depth of 30 fathoms.

**LIGHT.**—Upon the extremity of cape Nau is a white octagonal tower, from which at an elevation of 132 feet above the sea is exhibited a *fixed* white light, which is visible 18 miles.

**GULF OF TARANTO.**—Cape Sta. Maria di Leuca lies NE.  $\frac{3}{4}$  E., distant 67 miles from cape Nau; between them is the gulf of Taranto, 70 miles deep, in a NW. direction. The NE. and SW. shores of the gulf are sandy, but spurs from the lofty mountain ridges approach

within a short distance of the coast; at the head of the gulf, however, the land is comparatively low and is bordered by a sandy beach, behind which are several lagoons and marshes. Manna and licorice are cultivated, and there are extensive forests.

**Cotrone.**—About four miles NW.  $\frac{3}{4}$  W. of cape Nau is the town of Cotrone (ancient *Croton*), containing about 6,000 inhabitants; it is built on a rocky point, defended by a castle, and is the chief town of the district. A small port is formed on the S. side of the point by a pier which projects 100 yards to the SE., thence curving 250 yards to the SW.; the water, however, inside is so shallow as to admit only vessels of the smallest class. About 200 yards ESE.  $\frac{3}{4}$  E. of the pier head is a rock having only nine feet water on it. A British consul resides here.

**LIGHT.**—On the extreme of the pier, at an elevation of 23 feet above the sea, a *fixed red* light is exhibited, which is visible four miles.

**Alice point.**—From Cotrone a low and sandy shore, near which are some salt marshes, trends N.  $\frac{1}{4}$  E. 17 miles to Alice point, the ancient *Crimissa*. About half way between is the mouth of the rapid Neto river, the coast on both sides being slightly embayed. About four miles to the NW. of the river's mouth is the town of Strongoli, situated on a bare steep hill; on the shore northward are the tower and chapel of Melissa, three miles beyond which is Nuova tower. Off Melissa tower the coast is rocky and foul.

Alice point is sharp and bold with a tower on it; vessels occasionally anchor northward of it in favorable weather. Fish in large numbers are caught in the neighborhood, and off the shores of the gulf generally. On a lofty hill overlooking Alice point is the town of Ciro; it has manufactories of serge and coarse linens and a trade in manna, agricultural produce, and anchovies.

**Cariati.**—From Alice point a sandy shore curves in a NW. direction about  $6\frac{1}{2}$  miles to the point and tower of Fiumenica; on the N. side of the tower is the mouth of the stream of the same name. Half way between points Alice and Fiumenica are the castle and village of Crucoli, beautifully situated a short distance inland among plantations which abound in manna ash. Three miles farther is the small town of Cariati; the ascent to the town is steep, and it is entered by a gate and drawbridge; near it are the ruins of a baronial castle.

In favorable weather anchorage may be had off Cariati in a moderate depth.

**Trionto point.**—NW. by W. nearly 15 miles from Fiumenica point is Trionto point; between Cariati and Trionto point the sandy shore, which forms an open bay, is bold and clear of danger, having a general depth of 20 fathoms at  $1\frac{1}{2}$  miles off it.

**Rossano.**—A low sandy shore, within which are several salt lakes, curves westward and northward for 16 miles to Cascio point; several streams flow into the sea along this part of the coast. On the shore six miles westward of Trionto point is St. Angelo tower; two miles S. of it is the town of Rossano, situated on a rocky eminence. Near the town are quarries of marble and alabaster.

Rossano is remarkable as the birthplace of three popes, namely: St. Zosimus, John VII, and John XVII. It has a cathedral, and is the see of an archbishop.

Corigliano, a town which contains about 11,000 inhabitants, stands in a commanding position four miles westward of Rossano; it is crowned by an ancient castle, and round its base are orange and lemon groves. Corigliano possesses manufactories of licorice, woolen fabrics, and soap, and a trade in wine, fruit, manna, and timber.

**CASCIO POINT**, 16 miles NW. by W.  $\frac{1}{2}$  W. from Trionto point, is formed by the delta of the Crati river, which rises in the forests of Sila and has a course of about 50 miles; at three miles from its mouth it is joined by the Coscile river. The land in the neighborhood of Cascio point forms an extensive plain, bordered by forests of oak and olive trees.

From Cascio point the coast trends about N. by E.  $\frac{1}{4}$  E. for 16 miles to cape Spulico, the sandy shore between forming a slight bay; on the shore about a mile northward of Cascio point is the small hamlet of Casa Bianca, near which are several salt lakes; inland the country is thickly wooded. Perched on a conical rocky height nearly midway between Cascio point and cape Spulico, and only a short distance from the beach, is the village of Trebisacci.

**CAPE SPULICO** has a tower on it; one mile N. of the cape is the Ferro river, and  $1\frac{1}{2}$  miles beyond is the tower and village of Roseto.

Linzano tower stands on the beach  $7\frac{1}{2}$  miles N. of cape Spulico; rocks both covered and uncovered extend some distance off along this part of the coast. A sunken rock named Cervaro lies  $1\frac{1}{4}$  miles S. by E.  $\frac{3}{4}$  E., from Linzano tower. The town of Rocca Imperiale is conspicuously situated on a hill,  $1\frac{1}{2}$  miles westward of the tower. A tower stands on a point  $3\frac{1}{2}$  miles NE.  $\frac{3}{4}$  N. of Linzano, and the Sinni river (ancient Siris), a considerable stream enters the sea on its N. side; the river has a course of upwards of 60 miles through a dense forest and underwood of myrtle; off it is shoal water.

Between the Sinni river and Agri river, five miles to the NE., are several lagoons close to the beach; inland the country is well wooded and produces large quantities of licorice; wild boar, deer, and other game abound. The small town of Policoro, one mile southward of the

Agri river and one mile from the beach, is situated near the site of the ancient *Heraclea*.

From Mozza tower on the S. side of the Agri river a low sandy shore trends 22 miles in a NE.  $\frac{3}{4}$  N. direction to Lato tower, and thence eastward to the harbor of Taranto.

Several towers stand on the beach, and the country is well wooded. Torre a Mare, a square tower, stands between the Vassento and Bradano rivers; near it are the remains of the once flourishing Greek colony of Metapontum, and a salt lake in the vicinity is said to be the site of the ancient port.

**Lato tower** stands on the S. bank of the river of the same name, a branch of which communicates with an extensive lagoon. The surrounding low hills are covered with dwarf pine, juniper, and cypress; there is also a great extent of marshy land. The water is shoal for a short distance off Lato tower.

About three miles ESE.  $\frac{3}{4}$  E. from the tower and  $1\frac{1}{2}$  miles from the N. shore of the gulf is Amelia shoal, on which are depths of from  $5\frac{1}{2}$  to nine fathoms of water; around it are depths of 23 and 25 fathoms.

From Lato tower a low wooded shore trends eastward for  $9\frac{1}{2}$  miles to Rondinelli point, the NW. extreme of Taranto harbor. Shoal water about a mile off the shore for two miles northwestward of Rondinelli point, and  $1\frac{1}{4}$  miles westward of the point are three small shoals of from  $2\frac{1}{2}$  to three fathoms, with eight fathoms close outside, and five fathoms between them and the spit off the N. end of St. Pietro island; the W. extreme of the island bearing S. by E.  $\frac{1}{4}$  E. passes nearly half a mile outside these dangers.

**TARANTO.**—The harbor of Taranto is a semicircular indentation  $4\frac{1}{2}$  miles wide, between Rondinella point and cape St. Vito, and about  $3\frac{1}{2}$  miles in depth in an easterly direction; it is protected from seaward by the islands of St. Pietro and St. Paolo, which, together with shoal banks, extend nearly across the entrance, forming a spacious and well-sheltered harbor.

The city of Taranto (ancient *Tarentum*), which contains about 22,000 inhabitants, stands at the head of the harbor on what was formerly a narrow neck of land, but is now an island, a canal (crossed by a bridge) having been constructed on the N. side for defensive purposes; at the entrance to the canal, on the S. side, is the citadel.

The bridge crossing the canal between the two harbors is 160 yards long, over which is an aqueduct conveying water to the city, from Mutina, 12 miles distant.

The castle, flanked on one side by enormous towers, commands both harbors. The houses in the town are very lofty, and closely built.



Taranto has manufactories of linen, cotton, and velvet fabrics, and a trade in oil, fruit, grain, and shell-fish; honey is procured in large quantities, and the date palm is grown in the neighborhood. The value of the exports in 1868 amounted to 205,326*l*. A British vice-consul resides here.

**The Mare Piccolo** is an inlet extending  $4\frac{1}{2}$  miles eastward of the city; it forms two basins of unequal size, and has an average depth of from four to six fathoms over the greater portion of it. Only boats can enter this inlet, and it is used for the breeding of oysters and mussels.

**St. Pietro**, the largest of the two islands fronting the town, and which protects the harbor from westerly winds, is rocky, of irregular outline, and of but slight elevation; it is about four miles in circuit, and has the ruins of a monastery on its summit. From its N. side a rocky spit and shoal water extends nearly  $1\frac{1}{2}$  miles in a NNE. direction, leaving a channel 600 yards in width between it and the shoal water extending southward from Rondinella point; this channel has a depth of only  $3\frac{1}{2}$  fathoms in it. Shoal water also extends 400 yards from the S. side of St. Pietro.

**St. Paolo** is a narrow island about 500 yards long, lying SSE.  $\frac{3}{4}$  E. 1,100 yards from the extreme of St. Pietro island; the island is surrounded by shoal water, which on the S. side extends nearly 200 yards off, and on the N. upwards of 400 yards. Between the latter and the shoal water off the southeastern side of St. Pietro is a passage 600 yards wide, with from 15 to 20 feet water in it. The island is fortified, and on its eastern end is a light-house.

**Harbor.**—The deepest and widest entrance to the harbor is between St. Paolo island and cape St. Vito, which are nearly two miles apart, but the width of the navigable channel is contracted to 1,700 yards by the St. Vito shoal, having only  $2\frac{1}{2}$  fathoms on its extreme, and which extends 1,700 yards to the NW. from the point next within cape St. Vito; its extreme is marked by a *red buoy*. In mid-channel between the buoy and the light-house on St. Paolo is a depth of 22 fathoms, thence gradually decreasing to 16 and 14 fathoms  $2\frac{1}{2}$  miles within the harbor in the direction of the citadel.

The N. and northwestern sides of the harbor are shallow, there being only four to  $4\frac{1}{2}$  fathoms in the greater portion of the space between a line drawn from the E. end of St. Paolo island to the E. end of St. Nicoticchio island and the shoal off the N. end of St. Pietro.

**Sirena Bank**, with  $4\frac{1}{2}$  fathoms on its shoalest part, is 500 yards long NE.  $\frac{3}{4}$  N. and SW.  $\frac{3}{4}$  S. and 300 yards wide; it lies 1,800 yards SSE.  $\frac{3}{4}$  E. of St. Nicoticchio island and SW. by W.  $\frac{1}{2}$  W. nearly  $1\frac{1}{2}$  miles

from the citadel; the S. extreme, which is the shoalest, is marked by a buoy.

**Tarantola shoal**, lying SE.  $\frac{1}{2}$  E. nearly  $1\frac{1}{2}$  miles from the Sirena bank, has only two to  $2\frac{1}{2}$  fathoms on it, and is 600 yards long N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E., and 300 yards wide; the western and S. sides are connected to the great St. Vito shoal by depths of from  $3\frac{1}{2}$  to four fathoms, while on the N. and E. sides there are from 13 to 14 fathoms close-to. The northern extreme of the shoal, with two fathoms on it, is nearly  $1\frac{1}{2}$  miles S.  $\frac{1}{2}$  W. from Taranto cathedral.

The buoy on Tarantola shoal is a *red cask*, in eight fathoms water, on the following bearings:

San Vito light-house .....	S. $26^{\circ} 10'$ W.
San Paolo light-house .....	S. $74^{\circ} 20'$ W.
Tower on Rondinella point .....	N. $50^{\circ} 40'$ W.
San Cataldo .....	N. $1^{\circ} 30'$ E.

**San Vito shoal**, which extends in an easterly and westerly direction from the land N. of capé San Vito, is two miles long and from 100 to 1,000 yards wide; the depth of water on it varies from one to three fathoms. The western end of this shoal is marked by a red cylindrical buoy with conical ends, planted in six fathoms of water on the following bearings:

San Vito light-house .....	S. $22^{\circ} 50'$ E.
San Paolo light-house .....	N. $53^{\circ} 40'$ W.
Tower on Rondinella point .....	N. $11^{\circ} 15'$ W.
San Cataldo .....	N. $30^{\circ} 10'$ E.

**LIGHTS.**—From a light-house on cape St. Vito is exhibited a *fixed* white light showing a *flash* every *two minutes*; it is elevated 150 feet above the sea, and is visible 19 miles in clear weather.

From an octagonal white tower on the eastern end of the fort on St. Paolo island, at an elevation of 66 feet above the sea, a *fixed* white light is exhibited, which is visible in clear weather from a distance of 10 miles. This light is visible between the bearings of E. by N. round by N. to S. by W.  $\frac{1}{2}$  W.

**ANCHORAGE.**—The best position for large vessels is in the NE. part of the harbor, between the Tarantola shoal and the town, in from 12 to 16 fathoms water; northward of the former depth and westward of the town are several patches of rocky ground; when passing the shoal, which has from seven to 13 fathoms close to its outer edge, care should be taken not to shoal to less than the former depth, nor to bring the cathedral to the westward of N.  $\frac{3}{4}$  E. Merchant vessels usually anchor off the Lazaretto with warps to the shore.

The mooring buoy is a *red cask*, on the following bearings:

San Vito light-house .....	S. 12° 50' W.
San Paolo light-house.....	S. 43°     W.
Tower on Rondinella point .....	N. 83° 50' W.
San Uataldo .....	N. 79° 20' E.

**Water** is brought from a considerable distance by means of an aqueduct of ancient construction, part of which is carried by the bridge, joining the island to the main. On the N. side of the Mare Piccolo are remarkable springs of fresh water rising through the salt water, and in the harbor close off the town is another which rises from a depth of 28 fathoms.

**Cape St. Vito**, the southeastern point of entrance to the harbor of Taranto, is about 40 feet high; on it is a tower and light-house. The cape is surrounded by a rocky bank which extends one quarter of a mile from the shore.

**The COAST.**—A broken and but slightly elevated coast trends to the southeastward for 17 miles to cape dell' Ovo; for a considerable distance it is fronted by a sandy beach, and is bold and without hidden danger for two-thirds of the extent. On most of the points are towers, and small coves adapted for boats and coasting vessels are found along the shore.

**The Port** is formed by a breakwater, which extends about 306 yards in a NE. by E.  $\frac{1}{4}$  E. direction from a rock which lies about 70 yards from the N. shore of the town; inside the port are depths of from three to six fathoms. The eastern entrance is that used, the western opening being only adapted for boats. Vessels in this port lie with their heads to the northward, and stern anchor out.

**Rafo shoal.**—A rocky shoal having six feet of water over it lies about 425 yards N. by W.  $\frac{1}{2}$  W. from the eastern head of the breakwater, and has deep water round it. This shoal is easily recognized by the difference in the color of the water on it from that around.

A bell-buoy (iron) marks the Rafo shoal, situated N. of the port of Gallipoli. The buoy is moored in 16 feet of water, N. 14° W., 445 yards from the small jetty light, and 27 yards S. of the center of the shoal, where the depth is but 10 feet..

To enter Gallipoli, pass between this buoy and the head of the mole.

**LIGHTS.**—From the light-house on San Andrea island an *intermittent* white light is exhibited which attains its greatest brilliancy every *minute*; it is elevated 147 feet above the sea, and is visible in clear weather from a distance of 15 miles.

Also from the head of the breakwater a *fixed red* light is exhibited at

an elevation of 21 feet, visible in clear weather from a distance of four miles.

**ANCHORAGE.**—Gallipoli harbor affords refuge to small vessels when caught in gales in the gulf of Taranto, and shelter for large vessels may be found from nearly all winds on either side of the town with good holding ground. Northward of the town there is shelter from all but NW. and westerly winds which send in a heavy sea; a good berth is with San Andrea light-house bearing SW.  $\frac{1}{4}$  W., in from 10 to 15 fathoms water; towards the shore the holding ground is bad. A good anchorage with northerly winds is nearly one-third of a mile SE. of the SW. angle of the town, in from seven to 11 fathoms water.

A tunny net (dangerous to ships) has been established to the northward of the harbor of Gallipoli. The net extends to seaward from near the last houses east of the health office, in a NW.  $\frac{3}{4}$  W. direction for a distance of about 2,200 yards. Vessels navigating in this vicinity must be careful to give this danger a good berth.

**DIRECTIONS.**—The passage between San Andrea island and the islets of Campo and Piccioni, more than half a mile wide, may be used in making for either anchorage, the only danger being the rocks and shoal water off the S. side of San Andrea. The narrow passage between the islets and the W. end of the town is only available for very small vessels that know the locality.

Port Tramontana, the largest of these passages, is under a conical hill, on which is a guard tower, about  $4\frac{1}{2}$  miles from cape St. Vito; about five miles SE. of it, between the towers of Castelluccia and Salsole, is the mouth of another, which is open to the SW., and has four fathoms at the entrance. Off the sandy bights and points between this cove and cape dell' Ovo, sunken rocks and shoal water extend one quarter of a mile out.

**CAPE DELL' OVO** is a low, sandy, wooded point with a tower on it; off the cape a rocky shelf extends one-third of a mile, and continues to the eastward as far as Molini tower,  $3\frac{1}{2}$  miles distant. Columena point with a tower on it is a similar point to cape dell' Ovo, from whence it is distant  $13\frac{1}{4}$  miles E.  $\frac{3}{4}$  S.; between Molini and Columena towers the shore is wooded, and on the beach at about equal distances are Boraco and St. Pietro towers. The land in the vicinity of Columena is marshy, and on the E. side of the point the water is shallow; small vessels, however, anchor there with northwesterly winds.

**Port Cesareo**, five miles eastward of Columena point, is an indentation with a narrow entrance between several small islets or rocks; within it are depths of from 11 to 15 feet, affording shelter to small vessels. The islets which lie  $1\frac{1}{2}$  miles to the westward of the port are

surrounded by a flat, on which is a depth of only five or six feet water extending three-quarters of a mile southward of the islets, and having seven fathoms close-to.

On the sandy, wooded shores between Columena point and Inzeraglio point (distant nine miles) are several towers; from the latter point the coast, composed of alternate rocky points and sandy beaches, backed by moderately elevated land, extends 10 miles southward to Gallipoli. Several towers stand on the shore, which, with the exception of the bight immediately S. of Inzeraglio point, is steep-to.

**GALLIPOLI** (ancient *Callipolis*), a fortified town, is situated on a rocky island, two-thirds of a mile in length by half a mile in breadth and connected to the mainland by a stone bridge, on the W. side of which is a castle. Gallipoli contains a population of about 10,000.

The staple article of commerce is oil, which is stored in vats cut out of the solid limestone rock, which are peculiarly adapted for clarifying the oil. There are manufactories of muslin, woollen, and cotton hosiery, and an active trade in corn, wine, and fruit. A British vice-consul resides here.

San Andrea island lies three-quarters of a mile W. of the town; it is about half a mile in length N. and S., low, and has a light-house on its western end; between San Andrea and the town, but close to the latter, are the islets of Campo and Piccioni, and rocks and shoal water extend 300 yards off the S. end of the island. Islets and rocks also lie off the N. side of the town.

Making the port from the southward or westward, vessels should pass between the Rafo shoal and breakwater; the latter may be approached to within 100 yards.

**Pilots.**—Pilot boats are distinguished by a red flag with the word Pilot in white letters inscribed on it.

**Supplies.**—Water can be obtained from a fountain near the bridge, free of charge, and fresh provisions are readily obtained.

**The COAST.**—S. by E.  $\frac{3}{4}$  E., nearly four miles from Gallipoli is Pizzo point, on which is a tower; the point is rocky and from it a reef extends half a mile NW.  $\frac{3}{4}$  W. Between Gallipoli and Pizzo point is a sandy bay, on the N. shore of which is St. Giovanni tower; the Sameri river, which flows through marshy land, enters the sea at the head of the bay.

From Pizzo point the coast, which curves slightly out, trends to the SE. for 23 miles to cape Sta. Maria di Leuca; from Pizzo point to Pazzo rock (which is above water, and close to the shore), a distance of eight miles, the land is elevated and the coast rocky. Eastward of Pazzo a low and sandy shore extends two miles to St. Giovanni tower, off which

near the beach are several islets and rocks, whence rising in sandy hillocks it continues as far as Mozza tower  $3\frac{1}{2}$  miles distant. At Mozza tower the shore again becomes rocky and elevated, extending thence to cape Sta. Maria di Leuca. As far as Pazza rock the shore is comparatively bold, there being from five to 10 fathoms water at a mile off it.

**DANGERS.—UGENTO SHOAL.**—From Pazza rock foul ground skirts the coast to the SE. for  $6\frac{1}{2}$  miles as far as Pali point (off which is Fanciulla islet), in some places extending nearly two miles from the shore. The shoalest part of this sand-bank, named the Ugento shoal, lies  $1\frac{1}{4}$  miles W. of Mozza tower, and is one mile long (E. and W.) and about half a mile in breadth; on its N. edge is the Giritto rock, above water, and near the southern edge are two sunken rocks named Cavallo and Giumenta (horse and mare); over other parts of the shoal are depths of from eight to 18 feet. The light-house on San Andrea islet near Gallipoli, kept open of the land, leads two miles westward of the shoal.

## CHAPTER II.

### GENERAL REMARKS.—WINDS, THE BORA.—CURRENTS AND TIDES.— VARIATION OF THE COMPASS.

The Adriatic sea or gulf of Venice is the great expanse of waters which, branching off to the NW. from the main body of the Mediterranean sea, is bounded by Italy on the W. and by the Austrain provinces and Albania on the E.

The first of these names is derived from *Adria* or *Hadria*, founded in 1376 B. C. by an Etruscan colony, and once the most important town in the Adriatic, but now in ruins, some 15 miles inland, at the upper part of the gulf of Venice; the second name is from Venice, which was for centuries the chief city in the Mediterranean.

The Adriatic, from its southern limit, between cape Sta. Maria di Leuca and the island of Corfu, to its northern termination at the Venetian shore and the gulf of Trieste, is about 460 miles in length in a general NW. and SE. direction. From Brindisi, in Italy, and Durazzo, in Albania, the sea to the NW. is bounded by two almost parallel coasts, the general breadth being about 90 miles, and the greatest, between Fano and Novi, 110 miles. The narrowest part at the entrance is between capes Otranto and Linguetta, distant apart rather less than 40 miles.

The two sides of the Adriatic sea differ entirely in aspect and character, the eastern shore being generally rocky, replete with islands and ports bold of approach, but deficient in inhabitants, provisions, and in many parts in fresh water; the western coast, on the contrary, is comparatively shallow, and almost without any large ports, yet in most parts populous and abounding in provisions, water, and articles of trade. This peculiarity has so great an influence in the navigation of the sea that mariners cannot be too careful in making themselves acquainted with the advantages and inconveniences presented by the two coasts before they decide on their route.

Italian seamen frequently make use of the expression *sotto vento*, leeward, and *sopra vento*, windward, to designate the coasts of the Adriatic. These terms have reference to the direction in which the *bora*, or NE. wind generally blows; thus, the eastern is the windward and the western the leeward coast.

**THE WESTERN COAST**, as it will be termed throughout this work, is the Italian seaboard, beginning on the SE. at cape Sta. Maria di Leuca, and terminating on the NW. at port Buso, the entrance of the river Ausa, at the boundary between Italy and Austria.

It is generally of little elevation, and trends in an almost straight NW. line to Ravenna, where it bends to the N., and forms the Venetian shore. Its uniformity is broken in three principal places: First, at mount Gargano or St. Angelo, near the Tremiti islands; secondly, at mount Conero, between Loreto and Ancona; and, thirdly, at the delta formed by deposits at the mouth of the Po. The former two, which are high and terminate each in well defined elevations, form excellent landmarks. The celebrated chain of the Apennines runs almost parallel to the Abruzzo coast, between the two elevations. The summits of mount Corno or Gran Sasso d'Italia, 9,500 feet high, and of mount Maiella, which are its most elevated points, are remarkable, and may be seen at a great distance in clear weather.

The shore consists chiefly of sandy beaches, and, with the exception of the two points where the land rises, the soundings along it are regular, with an approach of considerable less boldness than on the opposite coast. Roadsteads are scarce; there are many harbors, of which a few only are capable of admitting large vessels, but which are nevertheless suitable to the busy export trade carried on along the thickly populated shore. The most important products exported are corn, rice, fruit, oil, wine, cotton, wool, silk, and salt. The great lakes between the village of Peschichi and the town of Termoli, named Varano and Lesina, have long been celebrated for the abundance, variety, and excellence of their fish; their margins are said to be unhealthful.

A great number of rivers and streams intersect the NW. portion of this coast from Ancona to the river Isonzo, near the head of the gulf of Trieste, and bring down considerable quantities of sand and mud, which encumber the shore with shoals and obstruct nearly all the harbors. The Italian coast is, however, always easily navigable in fine weather; and can be approached sufficiently near for the recognition of all its most conspicuous objects, which may be generally seen at a distance of 10 to 12 miles.

**THE EASTERN COAST** embraces the Austrian dominions of Istria, Croatia, Dalmatia, Ragusa, and the mouths of the Cattaro, and the Turkish province of Albania. It is in general high and picturesque, with almost perpendicular cliffs, and very deep water along shore. To these features, however, there is an exception between cape Linguetta and the gulf of Drin, where the shore is low and sandy and the water less deep. This coast runs almost SE. and NW., and in some places



forms deep bays. From Ragusa to cape Promontore, it is entirely bordered by islands, rocks, and shoals, which render the navigation intricate and often unsafe when overtaken by the bora.

Mariners, notwithstanding, give the preference to the eastern coast, particularly during the bad season, as it has some good harbors, and in many parts affords shelter in stress of weather, while on the western coast the only ports are those of Brindisi, Manfredonia, and Ancona, which are often of difficult access.

The water on almost every part of the coasts of Istria, Croatia, and Dalmatia to the gulf of Drin, and between the islands, is generally deep very near the land; but between the gulf of Drin and cape Linguetta the shore is not so bold, being bordered by shallow water, and soundings extend some distance seaward.

The greater part of the eastern coast is barren and uninhabited, and the trade is insignificant; with the exception of Trieste, Fiume, and Valona, the inhabitants of almost all the towns and islands are poor, and provisions, including water, are difficult to be obtained.

The basin of the Adriatic is said to be slowly diminishing in size. There are numerous evidences of encroachment of the land, on the sea, through deposition of soil by rivers. Owing to the peculiar situation of the high mountains of Illyria, the head of the gulf of Venice receives all the waters flowing from the southern declivities of the Alps and the Carniola mountains, situated between the Po and the Isonzo; here also flow out the Adige, Brenta, Piave, Livenza, Tagliamento, and numerous minor streams, each carrying down in freshets great quantities of alluvium, mud, and gravel, into the lagoons, and form vast shoals which border the intervening shore.

The effect of this accumulation is particularly perceptible along the whole coast between Maestra and Sdobba points. Thus Aquilea, which once may have stood near the sea, has long been an inland town, while the harbors of Liguentio, Romantino, and Timaro, said by Pliny to have existed on this coast, have entirely disappeared. Adria, which was a station for the Roman fleet, is now 15 miles inland. Another town of the name of Spina, formerly bordered by quays, is now completely buried under the sands. Ravenna, built on islands and piles on the margin of the sea, was, in the time of Theodosius the Great, a military port, subject to the influence of the tide; it is now nine miles inland, in the midst of gardens and fields. Portus Classis, its ancient harbor, has become a marsh four miles from the sea, from which it is separated by the Pineto or pine forest. The flat lands are subject to malaria in summer.

The color of the Adriatic sea, when undisturbed by any accidental or

local cause, is darker than that of the Mediterranean, being of a greenish hue. The specific gravity at its mouth was found by Captain Smyth to be 1,0291, at the depth of 40 fathoms.

**SOUNDINGS.**—In general, throughout this sea, the soundings along shore are according to the exterior character of the coast. Where the land is elevated and rocky, deep water will be found, and vessels may approach to a prudent distance; where it is low, level, and sandy, the depth is small. The shoalest water is along the Venetian shore and at the mouths of the Po.

The nature of the ground follows an almost uniform rule along the whole of this coast; fine sand is found near the beach, then sand mixed with mud, and lastly mud; in some places only the bottom is clay, covered with soft mud, and sometimes marl intermixed with sand and clay. The distance to which these several zones extend varies according to the strength of the current inshore and its extension seaward. Mud bottom, suitable to anchorage, will almost always be found at a distance of from one to three miles from the land, and the nature of the bottom is mud nearly everywhere towards the middle of the Adriatic.

The researches made at the commencement of the last century, have shown that but little difference exists between the matter of which the nearly horizontal layers of the bed of the Adriatic is composed and that of the surrounding continent, islands, and rocks. A white marble of uniform grain, resembling the substance of the Istrian, Morlacca, and Dalmatian countries, often occurs; in some places are found gravel, sand, and other matters, more or less metalliferous. Near the beginning of last century, Vitaliano Donati invited attention to the formation of a concretion of crustaceans, testaceans, and polyps, partially petrified, and intermixed with earth, which is said to be increasing, and may have the effect, so far, of gradually decreasing the depth.

According to Strabo's account of Adria the encroachment of the sand may be approximately estimated at about nine miles in 2,000 years.

According to M. de Prony the sands have advanced nine miles since 1604; in the twelfth century the sea was from six to seven miles distance from Adria; at the close of the sixteenth century, when a channel was opened for the river, the most advanced projections of its alluvial deposits were 12 or 13 miles from Adria. This would give a mean annual advance of about 27 yards. The extremities of these alluvial deposits being at present about 22 miles from the meridian of Adria, their annual encroachment may be taken at about 77 yards.

An extensive bank of mud intermixed with chalky and other matter, which by gradual growth may eventually form an island, has risen in

the middle of the gulf of Venice, where the depths are less than in other parts of the Adriatic.

A depth of about 536 fathoms is found in the middle of the entrance, between capes Linguetta and Otranto. The line of deepest soundings yet obtained runs thence about 30 miles S. of the island of Meleda, and S. of Lagosta, between Cazza and Pelagosa, and then takes a NW. direction; near Pomo islet the depth is about 100 fathoms; it then approaches the Dalmatian coast, and passes about 10 miles S. of Zuri and Inoronata islands, whence it takes nearly a middle course, bordering on the eastern shore of the sea, to the parallel of cape Promontore; at 25 miles to the westward of which the depth is 25 fathoms, gradually decreasing towards the gulf of Trieste.

In the gulf of Venice the depths are generally gradual, and vary between nine and 25 fathoms; relatively to the rest of the Adriatic this part appears to form a submarine plateau, which may strictly be considered a continuation of the great plains of Lombardy and Friuli.

**ISLANDS.**—Almost all the islands of the Adriatic are along the eastern coast between Ragusa and cape Promontore. They are numerous and appear to have originated in the breaking up of the lower grounds by some violent action, which has left their limestone summits above water. By the salient position of the promontory terminating in Planka point, they are divided into two distinct groups. The principal islands lying southward of Planka point are Meleda, Curzola, Lesina, Brazza, Lissa, and Lagosta; to the northward of the point the most important are Zuri, Inoronata, Grossa, Cherso, Veglia, Pago, and Lussin.

Their general direction is nearly NW. and SE.; they are all narrow in proportion to their length, and form various channels called after the nearest adjacent island, and which, being bold, with but few hidden dangers, give a variety of secure passages between them. The islands are replete with ports and harbors, some of which are of considerable capacity.

Near Gargano head, on the Italian coast, is a group of four islets, called the Tremiti islands, on the S. side of which good shelter from the bora may be found. South of Lissa is the isolated rocky isle of Pelagosa, nearly in the middle of the Adriatic, and between it and the Tremiti islands the low and dangerous Pianosa islet; lastly, to the WNW. of Lissa are Pomo, a high pyramidal rock with a dangerous shoal off its N. end, and between Lissa and Pomo is St. Andrea islet.

**GULFS.**—The small gulfs of the Adriatic are: the gulf of Trieste, in the most northern part of the sea, extending 20 miles in an ENE. direction, and comprised within the limits of Tagliamento point on the

N., and Salvore point in Istria, about 19 miles apart. The depth of water does not reach 15 fathoms. The shallow gulf or bay of Venice, between Tagliamento point to the NE., and Maestra point on the SW., is also about 20 miles deep, and, like the gulf of Trieste, the depth of water does not exceed 15 fathoms.

The gulf of Quarnero is separated by the peninsula of Istria from the gulf of Trieste; it extends about 60 miles from NW. to SE., and is contained between cape Promontore, the land of Nona, and Grossa island. It is in great part occupied by islands, from the four most important of which, Cherso, Veglia, Arbe, and Pago, the gulf is said to derive its name.

The small gulf of Cattaro, a peculiar formed basin indented and surrounded by steep cliffs, is on the eastern coast of the Adriatic.

The gulf of Manfredonia, the only one on the Italian coast S. of Gargano head, and between that and the town of Trani, is about 17 miles deep E. and W.

**WINDS.**—The navigation of the Adriatic in a sailing vessel requires care, owing to the liability of being caught in a gale without sea room, and therefore the winds demand constant attention, especially during the winter. During the summer they are light and variable, with frequent calms and occasional squalls from the northward; in winter they are almost always from N. or NE., or from SE., with thick fogs and rain.

The winds are very variable at the mouth of the Adriatic; they are steadier in the middle of the sea; but still more variable at its northern extremity, in the gulf of Venice; it is not unusual to see vessels, near the Po and Trieste, steering towards each other with totally opposite winds.

The weather is exceedingly unsettled along the eastern coast between the gulfs of Trieste and Cattaro; in summer calms, thunder, water-spouts, and the hot wind, which the Slavonians call *youg*, are frequent; and in winter heavy northerly blasts of the *bora*, with thick fogs and squalls.

The navigation of the western coast is nearly always hazardous in winter, but during summer it is generally without difficulty, fine weather with alternate land and sea breezes prevailing.

The most frequent winds in the Adriatic are from NE. to ENE., and from SE. to S. The former are the most severe, and require constant and careful attention; the latter, although less dangerous, are troublesome on account of the sea which they raise and the rain which accompanies them; winds from SW. to NW. blow occasionally, but they are

less frequent than those from SE. to NE., and the duration of westerly to that of easterly winds may be considered as one to three.

Winds from southward, and especially from SE., are prevalent at the entrance of the sea, whilst those from NE. and NW., particularly in the fine season, are most common in its northern part; it often happens that fresh breezes from NE., NW., and SW. blow in different parts at the same time.

The light breezes are generally from eastward, as in most parts of the Mediterranean; they have the effect of mildewing the sails, if the precaution of airing frequently in westerly and in northerly winds be not taken.

**The Bora.**—The name *bora* is generally given in the Adriatic to winds between NNE. and ENE. It is very dangerous and greatly feared, as it rises suddenly and blows with extreme violence; generally, and especially in winter, it blows with the greatest strength after a strong gale from SE. and is most persistent and violent on the eastern coast. Its general direction is across the Adriatic, and the limited breadth of this sea is one of the causes of the risk attending it, for a vessel unaided by steam and unable to carry sail may be rapidly driven towards the coast of Italy, where there is scarcely a place of shelter for large vessels.

Vessels generally let fly everything to receive the first blast, then bear up to the southward for any port they can fetch, or remain under bare poles till it is exhausted.

Off the gulf of Cattaro the bora, although less violent, sometimes renders it impossible for vessels to carry any sail, even when overtaken at a short distance from land; very often in this part of the Adriatic, on standing out at once, the wind will be found more moderate, and a vessel may then run for a shelter or keep at sea.

In winter, this wind is to be feared, especially in Vrullja bay or cove near Makarska, at the mouth of the Narenta, and off the valley of Giulana, Sappioncello; it is also usually exceedingly fierce between Zuri island and Planka point, from the high land in the vicinity of Sebenico.

In the channels of the Quarnero, and at the entrance of this gulf, too much precaution cannot be taken; the bora here rushes down from the whole line of the Julian Alps with such irresistible fury that it is not only prejudicial to navigation, but extremely so to agriculture, which has in some parts been consequently abandoned; the chief part of the maritime trade of Fiume can only be carried on during the fine season, and the otherwise eligible haven of Porto Re is almost useless. Whole districts are rendered uninhabitable, and as not a bush nor a blade of grass can grow on the shores most exposed, local craft usually anchor off the parts where vegetation is most abundant. When Velebit Gebirge,

or the high mountains of Croatia, are capped by white clouds a vessel should not venture into the Quarnero.

The bora sometimes obliges vessels anchored in Trieste road to seek shelter under Salvore point and along the coast of Istria. It is the more dangerous in the channels of the islands, because it generally takes vessels on the beam and there is but little room; the mariner should at all times keep under the weather island, in order to be able to bear up.

It gives sufficient notice of its approach to an attentive observer to allow of precautions being taken. When small dark clouds are seen rising from the mountains of the eastern coast of the Adriatic, and taking irregular directions, and large white, round, isolated clouds gather on the tops of the high mountains of Dalmatia, a bora may be shortly expected, which will continue to blow until the former disappear, and the latter no longer adhere to the land. As a general rule, the clouds only leave the sides of the mountains when the wind loses its force and is about to cease.

The barometer is no positive guide, though it generally falls slightly on the approach of a bora, and at times corresponds with the violence of the coming wind, yet it generally rises during the gale. If to the fall of the mercury are added any of the indications above mentioned, there should be no hesitation in taking every precaution that prudence may suggest.

The heaviest boras are at times announced some hours before they burst by a dense black cloud on the horizon in the NE., with light fleecy clouds above it, a rather lurid sky, and an unusual stillness of the atmosphere. The general direction of these gales is between N. and NE., and the ordinary continuance about fifteen or twenty hours, with heavy squalls, thunder, lightning, and rain at intervals. The bora most feared is that which, after blowing in sudden gusts for three days, subsides, and then returns for three days longer.

It generally dispels any hovering clouds or fog, and when it blows with great force the weather is very clear; a few small round clouds moving rapidly being alone visible; if the atmosphere should not be cleared after 24 hours, the wind will probably continue a long time, or a south-easter will spring up. In winter it is frequently accompanied by thick fogs and snow, causing excessive coldness.

It usually comes on at the rising or setting of the sun, abating, or frequently ceasing, at noon or daybreak; but should it continue in force at these periods, it may be expected to last a considerable time.

In winter it is most persistent, sometimes blowing for nine, fifteen, or thirty days, with short intervals of calm, during which it is not prudent to make sail.

In summer it seldom or never lasts longer than three days, and is then usually moderate; if it increases in strength, it is generally for a short time only, and after a great deal of rain; it has, however, some difficulty in rising as long as the mountains of the eastern coast are wet with rain; when it then occurs it is of short duration, and the force is generally in proportion to the dryness of the land. March, the end of May, and especially the early part of June, seldom pass without a gale.

The bora often succeeds a slight fall of rain following a long drought; should it not blow in such a case, SE. winds may be expected.

The bora at times does not admit of the use of a single sail, when a vessel cannot escape being set on the coast of Italy. Should it admit of any sail being carried, the tacks are so short that the vessel may get embayed on that coast, without much chance of beating off again.

In December, 1811, the French frigate *Flora*, of 44 guns and 340 men, was surprised by a bora, on her passage from Trieste to Venice, which threw her on the coast near Chiozza, where the captain and two-thirds of her people perished. In 1815 two merchant vessels which had anchored off the mole of Trieste were struck by a bora in the night, and foundered with all hands; and in 1820 the *Monte Cuculi*, a fine Austrian corvette of 20 guns, was met by a bora while under all sail, and instantly went down with the whole of her passengers and crew.

The bora is caused by the cold wind in the elevated valleys and mountains rushing down into the warmer basin of the Adriatic. At Trieste it comes down with fury by the pass in the Julian Alps, but its greatest strength rarely reaches beyond 30 miles from the shore.

**The Sirocco.**—SE. or *sirocco* winds are common throughout the Adriatic; they are usually steady, and only reputed dangerous on account of the heavy sea, thick fogs, and rain which accompany them; when they occur in winter the land is entirely concealed from view. They are frequently succeeded by a fresh NW. breeze.

The indications are a very sensible mildness of the atmosphere, even in winter, and dark clouds settling on the summits of the islands and lofty mountains of the eastern coast; these signs occur some time before the wind, which generally passes gradually over the whole sea.

A swell from the eastward often precedes this wind, and at times lasts after it has ceased; this swell, and an increase in the strength of the regular current setting to the NW. along the eastern coast, with a rise of the sea above its ordinary level, are sure signs of a SE. wind.

The barometer always falls with a SE. wind, and generally with all winds from the southward; when it continues to fall with the indications described, a SE. wind may be expected to blow with great force.

If after continuing some time the wind should die away, and be succeeded by a calm or by variables, and the signs above mentioned continue, a renewal may be soon expected.

It is more frequent in winter than in any other season, generally blowing alternately with the bora; between the two winds there is nearly always an interval of light variable wind.

It commonly lasts three days, and very seldom beyond nine days in winter. It comes on by degrees, and only blows with violence after thirty-six or forty hours; as its direction is right up the Adriatic, the sea gradually increases, the clouds become heavier, rain falls in abundance, and the weather becomes very foggy, especially in October, November, December, and January.

Sailing vessels near and outside the islands of the eastern coast may be in danger, should the SE. wind subside immediately after blowing hard and leave a heavy sea, which often occurs in the evening; when in this locality shelter should be sought for when clouds are gathering on the summits of the islands. The eastern coast between Ragusa and gulf of Drin is also dangerous, and especially off the gulf of Cattaro. On the whole of the western coast, and along the Venetian shore, where no shelter whatever is found, the sea breaks heavily.

In summer the SE. wind is never strong, and towards the middle of the Adriatic it generally alternates with light breezes from the E., and sometimes from the NW. In this season should the clouds which collect on the summits of the islands, particularly of Lissa, become detached, and rise in thick globular masses, a NW. wind may be expected to succeed.

When southeasterly winds die away in winter, spring, and autumn, they are generally followed quickly by those from W., and NW. to N., which bring fine weather.

**The Siffanto.**—Besides the bora and sirocco, which are the two principal winds in the Adriatic, the SW. or *siffanto*, and southerly winds, prevail occasionally. The SW. wind is frequently violent, but does not last long; it sometimes shifts suddenly to the SE.; these sudden changes are very dangerous in the vicinity of the mouths of the Po, where they always occur in strong squalls called *furiani*, with a heavy sea.

A southerly wind is often preceded by the same signs as a southeasterly wind, and it also gives rise to a high sea. Winds from S. and SW. are little felt among the islands, which afford protection from them; and when they are light in the offing, calms are nearly always to be found within the islands. They do not last long, and are generally succeeded by westerly and northwesterly breezes.



**The Maestro** or NW. wind is of rather frequent occurrence in the Adriatic, but mostly during the summer, on the western coast, and in the northern part of the sea; it is always followed by winds from south-eastward.

On the eastern coast it generally rises about mid-day, and subsides towards evening, when it is commonly succeeded by land or by variable winds, which in fine weather sometimes continue after sunrise.

In the fine season a strong NW. wind occasionally succeeds a south-easter along the western coast; but it abates at night, and during the morning is generally succeeded by light land breezes.

Winds from NW., N., and W. do not raise much sea, and they always enable vessels to leave the Adriatic.

**Local observations on the winds.**—At the entrance of the Adriatic the winds change with the seasons, being generally from S., SE., and W., in autumn and winter, and from NE. and N. in spring and summer. The latter may last for some time, but very seldom more than three successive days. Westerly winds, though often blowing hard, with rain in winter, are not to be dreaded, as good shelter from them can be found. Winds from E. and N. sweep over the mountains of Epirus, which in winter are covered with snow, causing intense cold; those from the southward produce a suffocating heat, rendered still more disagreeable by rain and thick fogs.

The entrance of this sea is liable to very sudden gusts, and when it continues to blow hard the sea is short and confused, subsiding, however, with the wind.

On the eastern coast, from the gulf of Drin to the gulf of Quarnero, the bora blows almost constantly in winter with great violence. SE. winds, accompanied by thick fogs and rain, prevail on this coast during the autumn, and often render impracticable approach to the gulf of Cattaro and the adjacent shores.

Land breezes of variable strength are common at night on the eastern coast, during the whole year, and at the entrance of many ports continue for a long time after sunrise.

In the neighborhood of the Narenta, when the clouds, which generally cover the top of mount Bukavac, rise and break, the bora may confidently be expected with hurricane strength; if these clouds are scattered in the sky, the bora is already blowing near the land, though it may not have reached the offing. Very intense cold is experienced in winter in this part of the Adriatic on the approach of the bora.

A curious phenomenon, which occurs in the mountains of Montenegro, may be noted here. In the most steady season of the year, in the finest day, and with the purest atmosphere, when not a speck of

cloud is perceptible, thunder is heard among the mountains, and it is observed that at these times all the rivulets and springs in the neighborhood discharge a greater quantity of water than usual.

In the gulf of Quarnero the bora is the prevailing wind; there, more than at any other part of the eastern coast, it renders navigation very dangerous, and between cape Promontore and Unie island it gives rise to formidable whirling gusts and a heavy sea. It sometimes blows furiously in Morlacca channel, along the Croatian coast, and as far as the middle of the gulf, while there is a dead calm at the islands at its entrance and in the offing. It is easy to know from the appearance of the Velebit Gebirge, the high mountains of Croatia, whether the bora is blowing, or about to blow, in Quarnero gulf. When the summit of this chain of mountains is covered with large whitish clouds, and small dark clouds are seen to rise from the gorges, every possible precaution should at once be taken against a gale.

The bora is less violent in summer, when it is called the *borino*; it abates chiefly at the entrance of the channels in the vicinity of the coast of Croatia, where it is followed by a light breeze from eastward, which blows until about 9 o'clock in the morning; then, after an interval of calm, the wind sets in from northwestward until evening during nearly the whole of the fine season.

In the gulf of Quarnero the dark clouds which precede easterly winds alight first on the summit of mount Ossero, at the N. end of Lussin island, then on Maggiore and Velebit mountains, after which they gradually cover the lesser elevations. In the winter the bora and the sirocco sometimes contest violently with each other for the mastery in this gulf; caution is therefore requisite in the navigation of these waters, and with southeasterly winds, even if blowing hard, any signs of the bora must be carefully watched.

The bora is almost constant in winter on the coast of Istria, where it sweeps along the shore. It is almost impracticable in a sailing vessel to take a harbor while it lasts, for on approaching land it is generally found to blow out of the inlets.

Southeasterly winds in winter become more southerly on reaching cape Promontore, but close to the land, along the western coast of Istria, they will be found drawing to the eastward.

Southwesterly winds are dangerous on the latter coast, upon which they blow and cause a heavy sea; although generally of short duration, the land becomes obscured, when it is difficult to take a harbor.

In summer, when the weather is fine, a light and variable breeze from NE. to E. blows almost every morning, nearly throughout the gulf of Trieste; it generally draws to the NW. towards noon; then to the S.,

and continues till evening. In this gulf two opposite winds sometimes blow at the same time with equal force—the one N. of Salvore point, the other between cape Promontore and Rovigno; vessels should therefore always approach Salvore point with great caution if the sky be not clear in the NE., which is a sure sign that the bora is blowing in the N. part of the gulf.

In winter, on the western coast between Venice and Gargano head, the prevailing winds are the bora and sirocco, which blow alternately; if they last for any length of time the sea rises and the navigation becomes dangerous, particularly near the mouths of the Po.

In summer, on this coast, the winds are light and generally off the land during the night and until mid-day; then from the S. or SE. till evening. The sea breeze on the Venetian shore usually comes on feebly and gradually, but sometimes springs up quite suddenly at the head of the gulf, accompanied by thick fogs; it is then of short duration.

In spring the winds here are variable; in autumn they are almost always from southeastward.

The SW. wind sometimes blows in violent squalls off mounts Conero and Gargano.

Off the coast between Gargano head and cape Sta. Maria di Leuca, the bora generally blows from the N. except in a very heavy gale; an off-shore wind is frequent at night, while the bora continues in the offing.

From a meteorological journal kept at Venice for five years, it appears that at the head of the Adriatic southerly winds are most frequent during the summer months to September. The wind is seldom from the northward between April and July, and it is generally variable during fifteen days of each month of the year. It is to be observed that about twenty days of fine weather, with light breezes or calms may be depended on in any month of the year.

The rain-gauge shows that 32 inches of rain fell annually, of which 4 inches in September, and 6½ inches in October, January, February, May, and December—periods at which southerly winds are not very frequent in the upper part of the gulf.

The range of the barometer is but small throughout; its indications should, however, be consulted in navigating the Adriatic. The mercury usually rises with winds from the northward, and falls with those from the S. or SE. Bora gales generally produce a momentary depression in the mercury; sometimes this fall is very slight, and far from adequately announcing the coming storm. Mariners should therefore be on their guard when it descends, though but little, especially if the fall be accompanied by the appearances already described as precursors of the bora.

**CURRENTS.**—A regular northwesterly current sets from the Corfu channel along the eastern coast, sweeps round the gulf of Venice, and thence, more rapidly, outward along the western coast. It is almost inappreciable beyond a distance of six to 10 miles from the shore. This general action is accompanied by a sufficient tidal influence to cause a variety of local sets called *ligazzi*, some of which prevail right across—a natural consequence of the outline of the Adriatic and the numerous islands.

The rate of the Adriatic current appears to be very irregular, varying in calm weather according to locality and season; it is least in summer, when there is scarcely any current on the Venetian or Italian shores as far southward as the Tronto river, but where it increases in strength, and at times runs at the rate of three miles an hour, its greatest speed being within three miles of the shore.

The currents in Corfu channel greatly influence those in the Adriatic. In this channel, and between the Ionian islands, the stream is remarkably affected by the wind, but generally sets to the northward.

There is sometimes in the Corfu channel a surface current to the southward, which is retarded or increased according to the force and direction of the winds in the offing. When it blows rather strong from the N. the waters set to the southward at the rate of  $1\frac{1}{2}$  or two miles an hour, and a fall of three to four feet is occasioned. A southerly wind causes a rise to about the same amount, and the current then sets northwards. But this is not confined to the channel, although it is there the most marked, for over the whole Ionian sea southerly winds cause a rise of about a foot, and northerly winds a fall of about the same amount; if the winds are strong and continuous, the elevation and depression are greater.

At the entrance of the Adriatic, between Corfu and cape Linguetta, on the Albanian coast, the current generally runs to the NW. about half a mile an hour, increasing perceptibly as cape Linguetta is approached; it is generally greater with the winds from the southward.

The currents are very variable and frequently strong towards the middle of the entrance, where in fresh northerly breezes they set to WNW. and WSW. at the rate of three-quarters of a mile to a mile an hour; along the western coast between capes Otranto and Sta. Maria di Leuca the current is generally strong, except in calm weather and during the fine season when the wind blows directly on this coast. In a calm, at six miles from the land, the current sets about S. by W. at the rate of a mile an hour, and near cape Sta. Maria di Leuca at more than two miles. In fresh winds from the NW. they soon attain a strength of two, three, and even four miles and hour.

The westerly direction of the current at the entrance of the Adriatic may be considered almost constant; at times, however, under the influence of winds from W. and SW., along the Ionian islands, and as far as cape Linguetta, there is a set to the eastward of about a mile an hour, and even more between the islets northwestward of Corfu, where in December it has been found running N. by E.  $\frac{1}{2}$  E. two miles an hour in a smooth sea, with a light southwesterly wind.

From Saseno island at cape Linguetta, the stream appears to divide into two parts, the inshore branch taking a northerly direction as far as the gulf of Drin, with an irregular and often scarcely perceptible rate, but which at times with SE. winds amounts to one and  $1\frac{1}{2}$  miles an hour. This current follows rather regularly the coast as far as cape Rodoni; its greatest velocity being near the headlands, but in the bays it appears to be diffused. Beyond the gulf of Drin it follows the direction of the coast.

The other branch from Saseno island runs generally in the direction of Meleda island, with a velocity varying in calm weather from half a mile to two miles an hour. When influenced by southwesterly winds, and even in calms, this current frequently sets northeastward, about three-quarters of a mile an hour. Between cape Linguetta and Meleda island, southing in the currents is rarely found; it is only met westward of this line, where it increases as the coast of Italy is approached, especially with a northerly breeze.

Off the gulf of Cattaro, the inshore current of the Albanian coast is deflected by an outset, caused by SE. winds, which drive the water towards the coast; the two streams produce off the gulf eddies which may affect a sailing vessel, if becalmed.

Beyond Cattaro the general current resumes its course, and off Ragusa is obstructed by the numerous islands to the northward, when it sets chiefly to WNW. and W.

Among the islands, the stream is generally in the direction of their length, or from E. to W., and it is more regular in the larger channels than in the others. The rate varies according to the wind and state of the tide, which latter is considerably felt here and on the coast abreast; with southeasterly winds it sometimes reaches  $3\frac{1}{2}$  to four miles an hour, especially at the eastern entrances. In the narrow channels it is more rapid and variable, in consequence of the water within them with difficulty finding its level, at flood and ebb, outside the entrances.

In the Narenta channel the current sets to the W., acquiring great strength in easterly winds, and when the waters of the river are swollen; when these winds fall, the stream is observed to advance along

the Sabbioncello peninsula, leaving a counter current favorable to the navigation of the channel along the island of Lesina.

In Meleda channel, with the wind blowing hard from SE., the current runs WNW. at the rate of three and four miles an hour.

In Curzola and Sabbioncello channels, the westerly set is tolerably regular; but SE. winds accelerate it, particularly in the latter, which then becomes almost impracticable to sailing vessels from the westward.

The current in fine weather follows the general direction of Brazza channel. Irregularities are produced by the offsets of the Narenta and the Cetina, but they are of short duration.

In Solta channel the stream sets round and upon the Zirona islands.

In the small channel of Spalatro, it is variable in force and direction.

Outside the islands of Lagosta and Lissa there is a regular westerly current, but on closing them it becomes uncertain. About Lissa the set is nearly always to the W.; with continuous southeasterly winds it runs with great strength, particularly towards the western part of the island, whence it strikes off to the NW. and causes an eddy which renders this passage dangerous. The westerly current, in this part of the Adriatic, is accelerated by the outset from the channels of the various islands.

In light winds and calms, the set to the W. is at the rate of about three-quarters of a mile an hour between Pelagosa and St. Andrea islets, but with fresh NW. winds its force proportionately decreases.

Near St. Andrea and Pelagosa islets, the current, particularly in winter, has no regular direction, but produces dangerous eddies; these islets should, therefore, be avoided. After passing Lissa and St. Andrea the current apparently takes its former direction, parallel to the islands and the coast.

About Planka point the current is always rapid and variable, and in SE. winds violent eddies are produced. From this point, and among all the islands to the NW., the tide is considerably felt, and contributes greatly to the irregularity of the current.

At 10 miles seaward of the islands N. of Planka point the general direction is N. by W., with a rate decreasing gradually from three-quarters to less than half a mile between Grossa island and cape Promontore, but in a strong bora it entirely ceases.

Off Premuda island a branch of the NW. current flows SW. towards Anchona, and joins the stream along the Italian coast.

Between Planka point and Zuri island the currents resume their regularity and westerly direction, modified only by strong northerly winds and the set of the sea.

The stream runs generally in the direction of the islands between Zuri island and the Quarnero; but in the narrow channels the water is in a state of constant agitation, and the numerous rocks and islets which lie in them destroy all regularity of flow.

In the four passages between Zuri and Zlarina islands, and in the vicinity of Sebenico, the set is almost always in an oblique direction, with a velocity frequently of three and four miles an hour, which demands great attention. Amongst the extensive cluster of islands and rocks SE. of Incoronata island it is rapid.

At the eastern entrance of Mezzo channel and in the vicinity of Tre Sorelle islets the current runs with great strength, regular in fine, but very variable in rough, weather.

In Pasman strait it is liable to great irregularity, caused by the rocks and islets; strong winds give the stream a motion inclining across the eastern entrance of that channel, when it acquires a rate of three to four miles an hour.

In the Zara channel it sets northwestward with some regularity, with a velocity at times reaching three and four miles an hour.

In Quarnero gulf, and the channels of the Dalmatian coast, the currents are irregular, varying in rate and direction according to wind and tide; they are also influenced by the rivers and numerous islands. Gales from the offing throw a large body of water into the channels, where it is pent up till the wind abates, then runs back with rapidity; if, on the contrary, the winds are from the northward for any length of time, the water is driven into the offing, and as soon as the wind moderates returns with force.

In the Great Quarnero channel, with northerly winds, and during the whole continuance of the flood tide, a counter current will be found setting to the northward along Cherso island. In proceeding to Fiume it is, therefore, preferable to keep along that island instead of the Istrian coast until in the Farasina channel. With the same winds the southerly current at times attains a rate of four miles an hour and in a sailing vessel is almost insurmountable.

During a heavy bora a stream sets along the coast of Istria to the SW., and out of the Quarnero channel at about a mile an hour; it advances more slowly towards Premuda island, where it takes a SW. by S. direction; in approaching St. Andrea islet it sets SSW. and S. As the parallel of St. Andrea is approached, the influence of the general SW. current is more and more felt.

Well out in the offing, in the vicinity of Pomo islet, and between the islands of Lissa and Premuda, very irregular streams will be found.

About cape Promontore and the rocks which surround it, the currents

are very strong and variable. Under the influence of the bora they set to the W. and WNW. more than a mile an hour, and their effect is felt as far as Pola. Caution is therefore necessary when in the vicinity of this as well as all other projecting points on the eastern coast.

In ordinary weather, beyond cape Promontore and as far as Trieste, the stream sets slowly along the coast of Istria, strongest at Auro point, at the Marmi Grande and shoals in the vicinity of port Orsera and Salvore point, but its breadth does not generally exceed two or three miles. With northwesterly winds there is a strong set towards the Brioni islands.

Between Salvore point and Trieste the current turns towards the E. and is always felt at the latter place, where it sweeps round the bay on its course to the Venetian shore at the rate of about a mile an hour, decreasing in the offing.

In the gulf of Trieste, in fine weather, the currents are regular, and their direction always southerly. At a short distance off the coast of Istria the motion of the waters is in general towards the SW. or the Venetian shores, and is tolerably regular in fine weather; but it is greatly influenced by wind and tide. This irregularity is much more perceptible on the eastern coast than on the western.

During the fine season there is scarcely any current in the middle of the gulf.

About midway between cape Promontore and mount Conero, the set varies between SSW. and SE., at a rate generally of one-quarter to half a mile an hour. There is little or no current during the fine season.

The inshore current, from the head of the gulf of Trieste, always sets slowly about W. by S., following the various sinuosities of the coast. It is hardly perceptible during calms in summer, and SW. winds, but under the influence of the bora it probably runs about a mile an hour.

The tides which are perceptible on this coast, and the rivers which empty themselves into the sea between the Tagliamento and Maestra point, have the effect of diverting the current from its usual course; the rivers also bring down quantities of mud and sand, which alter the shape and direction of the banks along the coast, and affect the set of the stream. At Venice, in particular, the sea flows rapidly into the channels and harbors of the lagoons; in receding, the streams in strong sea winds give rise to wide and dangerous eddies.

The general direction of the southerly current is never destroyed, though it may be influenced by wind or other causes, and its continuance is proved by the direction and form given to the banks at the entrance of the harbors and the mouths of the rivers.

A proof of the constant southwesterly direction of the currents from



the gulf of Trieste to Maestra point, is the uniform deposit of alluvial matter which has been occurring for ages on this seaboard, an effect which could not have been caused by winds or tides. Deep water is found on the coast from Trieste to the mouth of the Isonzo, while the shores southwestward of this, towards the Piave, and at the entrances of the lagoons, are fronted by shoal water over a sandy bottom; even the lagoons have a tendency to fill up, notwithstanding an incessant scour. At the mouth of the lagoons, at Malamocco and at Lido, large accumulations of sand are formed in a triangular shape, with the apex pointing southward. Between Venice and Trieste are the Isonzo, Tagliamento, Livenza, Piave, and other streams; and it is evident that the sand and mud brought down by them are carried southward by a regular and constant current. If, on the contrary, the water flowed at all to the N. at the head of the gulf of Trieste, the port, as well as all those on the eastern coast of Istria, would present the same inconvenience.

From the delta of the Po the streams spread out to the eastward, and then bend to the S. and SE.; in spring, on the melting of the snow, and after abundant autumnal rains, the action of the freshets is most perceptible.

From Maestra point the current of the western coast of the Adriatic takes its general direction to the SE. As far as Ancona, it is subject to the deflection caused by the offset from the numerous streams and rivers; its rate is never considerable, seldom exceeding a mile an hour, after the great freshets of the Po, when the surface of the sea to a distance of eight or 10 miles in the offing is colored by the mud brought down.

The constant southeasterly set of the waters along the Italian coast of the Adriatic is demonstrated by the immense deposits formed by the Brenta, the Adige, and the Po, which, by their continued accumulation, cause a gradual advance of the shore seaward, and tend to encumber the harbors. Rimino, Fano, Pesaro, Sinigaglia, and Ancona are said to be filling slowly. The old Rimino light-house is now two miles inland.

In the vicinity of Ancona, and principally to the southward of the port, the current deflected by the projection from mount Conera sets to the eastward, frequently at the rate of a mile an hour; but if the wind blows long from NW. to NE., the rate exceeds two miles an hour, and the stream may then be dangerous to vessels approaching the land for Ancona, as it sets on St. Clemente rocks.

In the neighborhood of Ancona the regular current of the Italian coast acquires its greatest strength.

Between mounts Conero and Gargano head the current continues its

course, following the Abruzzo coast; its rate is estimated at a mile an hour in fine weather, but it is more rapid near the shore of mount Gargano.

The coast of mount Gargano causes a portion of the current to branch off to eastward, while the other part sweeps round the head close along shore, and flows across the entrance of the gulf of Manfredonia without entering it.

The harbor of Manfredonia, which dates from 1256, is slowly filling with sand washed up by the sea during SE. gales, but not from the effect of currents.

The branch setting eastward from the coast of mount Gargano flows towards Pianosa and Pelagosa islets, and meeting the western stream already mentioned produces rapid eddies. Around and among the Tremiti group, the easterly current is of great strength.

From Gargano head to Otranto, the inshore stream, having resumed its SE. direction, attains its greatest velocity, which is estimated at  $1\frac{1}{2}$  miles between Gargano head and Brindisi, and nearly  $1\frac{3}{4}$  miles an hour between the latter and Otranto; with northerly winds this rate rapidly increases, and sometimes exceeds three miles an hour. It is generally weak in summer, especially with on-shore winds, but with those from NW. its strength is sufficient to require attention.

The sand carried by the currents, and proceeding from the rivers Candelaro, Ofanto, and Carapella, is said to have formed the ridge of land which borders Salpi lake. Also, that farther S. it is slowly filling the harbors of Barletta, Trauni, Bari, and Brindisi more than 100 miles distant.

The current after passing cape Otranto follows the trend of the coast southward, and flows close round cape Sta. Maria di Leuca into the Mediterranean.

The off-shore currents on the Italian coast are variable in their strength and direction according to prevailing winds. The bora winds drive the water towards the Italian, and SW. winds towards the Dalmatian, coast, while SE. winds cause an irregular curve on either side. After a strong wind has lasted two or three days, a current contrary to that previously running will always be found as soon as the wind abates, and will continue until the former has resumed its usual course.

From the great influence of the slightest change of wind on the currents of the Adriatic, it is supposed that they do not extend to any great depth; and, according to some observations, the motion of the stream does not reach beyond four or five fathoms, while from others it is considered to extend to a depth of 11 fathoms.

**The TIDES** of the Adriatic, like those of the Mediterranean, are

very slight and irregular, but an approximate knowledge of the rise of the tide, and of the time of high and low water, may often be of use; and attention should always be paid to the various causes likely to produce irregularities in the tide of any harbor visited. At the mouths of the rivers, especially of the Po, when the waters are swollen by rains or the melting of snow, the rapid outset necessarily retards the floods and accelerates the ebb. The land should therefore be approached with caution at such times, and if necessary the advice of local pilots obtained.

The tidal action is scarcely perceptible at the mouth of the Adriatic; it is first felt at Cattaro on the eastern, and at Brindisi on the western, coast, becoming stronger towards the northern part of the gulf.

On the shores of Dalmatia the tides are weak and irregular; observations show a slight range of tide in calm weather, but none with fresh NW. winds.

In strong SE. winds there is sometimes a rise of one to nearly two feet, and in the channels, and the narrow passages between the islands, a rapid tidal stream of short duration is produced.

The tide stream off the coast of Istria has been found to set against the NE. wind at the rate of nearly a mile an hour, and then return to its SE. course; and at times the effect of the ebb stream has been to cause an apparent stillness of the offing and central waters.

On the western coast the rise varies from one to nearly four feet at springs, according to local circumstances and prevailing winds.

Bora gales cause a rise along the coast of Italy; at Barletta, Bari, Monopoli, and Brindisi a tidal action is said to range from a few inches to three feet.

At Venice, with a heavy gale from SE., the sea sometimes rises six feet above the general level; these gales render the lagoons unapproachable and the channels unsafe; northerly winds cause a fall sufficient to uncover the mud of the lagoons.

A mean of five years' observations at Venice, according to Professor Toaldo, gives a rise and fall of two feet at spring; also the approximate establishments of the ports of Malamocco and Chioggia 10 h. 30 m., and of that of the port of Venice 11 h. 15 m.

**VARIATION of the COMPASS.**—The general direction of the lines of equal variation in the Adriatic and in that portion of the Mediterranean sea contained between the meridians of  $10^{\circ}$  and  $25^{\circ}$  E. is nearly N. and S. (true), ranging in amount at the present time, 1880, from  $12^{\circ}$  in the western part to  $7^{\circ}$  at the eastern.

The annual decrease at the northern part of the Adriatic sea is nearly  $7'$ , and at its southern  $6'$ ; near cape Malea or St. Angelo it is about  $5'$ .

## CHAPTER III.

### NAVIGATION OF THE ADRIATIC.

The navigation of the Adriatic, like other narrow seas, requires experience. The difficulties arise from the frequency in winter of thick fogs and boisterous winds, from the narrowness of the sea, and from the want of places of refuge in bad weather. As a general rule the eastern side is to be preferred, both in passing up and in leaving the Adriatic, notwithstanding the disadvantage of adverse currents, when proceeding to the southward along this shore. Under favorable circumstances, and in the summer season, well-conditioned vessels may, on sailing southward, venture to the westward.

On the western side a sailing vessel can seldom reckon upon reaching shelter from a sudden gale, and great risk would be incurred if surprised by bad weather in the vicinity of the shore; whereas on the opposite shore there are nearly everywhere good ports, or places of shelter, especially from the bora.

In a sailing vessel the greatest possible vigilance should be used to avoid being caught unprepared in a bora, and at the slightest premonitory symptoms of it no time should be lost in seeking the nearest place of refuge, as the violence of the gale may place a vessel to the westward, and reduce her to the necessity of anchoring on an open coast, with bad holding ground. The anchorage at the Tremiti islands, or that SW. of Gargano head, would afford shelter to a vessel so overtaken, if she could weather that headland.

The navigator should be also on his guard against the sirocco or SE. wind, which, when violent, is dangerous in some parts of the Adriatic; but as it generally gives ample warning, and invariably comes on to blow gradually, there is usually sufficient time to secure shelter under the islands.

**Making the Land.**—It is customary for vessels bound to the Adriatic from the Mediterranean to endeavor to make Corfu island, which, being elevated, is visible at a considerable distance. Approaching from westward, the mountains of Epirus are first seen, and then Corfu and its islands, forming a long chain of small regular hills. The monastery crowning mount St. Salvatore, at the N. part of Corfu, forms a good

mark. The island may be boldly approached, and a course steered westward of Fano island for cape Linguetta, the termination of the eastern coast, at the entrance of the Adriatic sea.

Sometimes cape Sta. Maria di Leuca is sighted, but occasionally the landfall is more to the westward, on the Italian coast. Cape Sta. Maria di Leuca is easily recognized, being 520 feet high and projecting southeastward: when viewed from the southward, it presents a steep, rocky face, precipitous at the edge of the sea; from southwestward and westward it is seen to terminate seaward, in a slope of about  $45^{\circ}$ ; when approached from southeastward and eastward, the declivity appears more gradual. On its summit are a chapel, a white signal tower, several houses, and near the extremity of the cape a white light-house.

In making the land with southeasterly winds, which usually bring thick weather, it is difficult to distinguish the coast of Italy even at a short distance; it is then better not to make the land much to the westward of cape Sta. Maria di Leuca, as the shore should not be closed on account of the foul ground westward of Pali point. If the Italian coast should be sighted, every effort should be made to close cape Linguetta and the Albanian coast, especially in the bad season.

The chances of favorable or unfavorable winds on entering the Adriatic will be according to the time of the year: thus in the autumn and winter, southerly, southeasterly, and easterly winds prevail; in the summer, the most common winds are northeasterly and northerly; the latter last a considerable time, but never strong for more than three days.

On making the land with fair winds, viz, winds between SE. and SW., a course should be steered to pass about 12 miles from cape Otranto. In the winter, with strong winds, a heavy sea and rain are almost continuous at the entrance of the Adriatic; nevertheless there should be no hesitation in proceeding after having verified the vessel's position, as shelter may be easily found if it should become necessary.

With contrary winds the Albanian coast should be closed, to take advantage of the weatherly current, which, setting to the NW., is favorable as far as cape Linguetta. The Italian coast between capes Sta. Maria di Leuca and Otranto should then be avoided as much as possible, for in northerly winds the southeasterly current is always rapid.

In the fine season northwesterly winds often blow rather fresh during the day at the mouth of the Adriatic, and vessels, if unable to beat against the current which constantly sets out near the middle of the entrance, proceed to the anchorage of port Castro. With a violent bora it is not prudent to attempt to enter the Adriatic; a vessel should then anchor under cape Sta. Maria di Leuca till the gale is over.

**The Albanian Coast**, between Corfu and cape Linguetta, along which a vessel should work up against contrary winds, is high and bold, offering no shelter or good anchoring ground; therefore, it should not be closed with winds which make it a dead lee-shore, although the current would probably be favorable.

When proceeding to the gulfs of Drin, Cattaro, or Ragusa, after passing cape Linguetta, no remarkable point presents itself along the generally low sandy coast of Albania, except cape Laghi, the high land immediately N. of Durazzo, and that of cape Rodoni; and care should therefore be taken to keep a good offing. During the first part of the course, the current will be found setting northwestward, at about a mile an hour, and northeastward when about abreast of Durazzo.

If overtaken by a heavy gale from the southward or SW., which would be sometimes attended with danger on this part of the eastern coast, shelter may be sought in Valona or Durazzo bays. The first of these is the easier of access under all circumstances; it would sometimes be imprudent in a southerly gale to run for Durazzo bay, as the adjoining land is low and not easily distinguished in thick weather. If unable to fetch Valona bay, it would be advisable to make for Rodoni roads, where good shelter will be found eastward of the cape. In Antivari roads shelter may be found on the N. side of Volovica point, which forms its SW. extreme.

The winds chiefly to be apprehended between cape Linguetta and Cattaro are the bora, which blows from between NE. and ENE.; and SW. winds, which are right on the shore; and, with reference to making the land, SE. winds which are usually accompanied with thick weather.

If, when between cape Linguetta and Cattaro, warnings of the approach of a bora gale should be perceived, a vessel, if sufficiently far northeastward, should haul close to the wind on the port tack, and seek shelter under the Albanian coast, in the indentation of the coast between Antivari and cape Dulcigno, or along the shore between the latter and St. Giovanni di Medua, or finally in Lales bay, SE. of cape Rodoni. If to the northward, and sufficiently near the shore, with the bora not too violent, a vessel of light draught might, by immediately standing upon the starboard tack, reach shelter in Molonta or in Traste bay, or, if of considerable draught, in Calamota channel. Lastly, if a vessel should be too far southward to reach one of the above places, endeavors should be made to fetch the anchorage at Meleda, to avoid the necessity of running to leeward.

But it should be recollected that all these places become difficult to reach as soon as this wind blows with more than moderate strength.

In all cases great caution must be used in navigating the Dalmatian coast.

**Cattaro.**—On approaching the highlands of the gulf, the bora at times reaches the vessel with such violence, and raises so heavy a sea, that attempts to make a port would be fruitless, and the most prudent measure then is to scud under bare poles for shelter in the gulf of Manfredonia, or to endeavor to leave the Adriatic for the anchorage of Sta. Maria di Leuca. Sometimes, when driven from under the land by the violence of the bora, the wind will be found moderate at the distance of 10 miles from the coast, but even then it would be advisable to seek shelter elsewhere, as there would be no probability of making out the land.

**Ragusa.**—In a sailing vessel the land should not be closed early in the day with southeasterly winds, as morning calms and current eddies would probably render the vessel unmanageable. Ragusa is not a safe anchorage in a strong southeaster.

**Breno Bay,** northward of Ragusa Vecchia, affords good shelter for vessels of any draught in a bora or southeasterly winds, and is consequently a good place of refuge.

**Calamota Channel.**—The direction given with regard to approaching Ragusa is applicable to vessels entering the channel from the eastward; indeed, it would be advantageous to make Ragusa first, as the currents set to the westward along the land. When arriving from the eastward, the easiest and most frequently used passage is between Pettini rocks and Calamota island.

**Islands, &c., eastward of Planka Point.**—The channels formed by this group are generally tolerably wide, and less obstructed by rocks and shoals than those formed by the islands northwestward of Planka point. The currents are regular in ordinary weather, and the navigation is not difficult. The precaution chiefly to be borne in mind, with reference to the passages between the islands, is to keep, as much as winds and currents will permit, under the S. side of the islands, so as to be always on the weather side of the channel, and therefore with a port under the lee in the event of the bora coming on suddenly. This is applicable to all other passages on the eastern coast of the Adriatic.

On approaching the islands, mount Tmor, 2,954 feet high, serves well to indicate the position of the entrance to Meleda channel, which is at the western extreme of that of Calamota, and is used by coasting vessels only. In the winter season strong currents set to the westward, and with southeasterly and southerly winds the shore of Meleda island should be closed to avoid the rough sea under Sabbioncello peninsula; it is important not to be becalmed near the shore of the latter during

these winds, which often die away towards the evening, leaving a considerable swell. With the bora, on the contrary, the coast of this peninsula should be kept close aboard.

When the group is made from southward or from southeastward, Cazza and Lagosta islands, the farthest from the mainland, are visible at a considerable distance. Mount Hum, 1,250 feet high, at the W. extreme of Curzola, will next be seen; then mount Kon, 1,687 feet high, of the same island, remarkable for the various shapes which its summit assumes; and subsequently the most elevated part of Lagosta, with its chapel; but the most conspicuous object, from whichever quarter the islands may be approached, is mount Vepar on the mainland. Giuliana valley, in Sabbioncello, is the best guide to the western entrance of Meleda channel, and of the passage between Meleda and Lagostini islands.

On approaching the islands from northwestward or westward, it is customary to make Planka point, which is easily recognized when arriving from southwestward or from the Italian coast; Pomo and St. Andrea islet are first seen, then mount Hum of Lissa, Lissa island itself, and the two Zirona islands.

**Cazza and Lagosta Channel.**—If bound to Lesina, Brazza, or other channels, the passage between Cazza and Lagosta islands should be taken, or both islands should be left on the starboard hand, and a course shaped for the western extreme of Lesina; this point is easily distinguished by the forts which crown the heights surrounding the town, and by mount St. Nicolo, which has a fort on it.

**Lagosta Channel** is only used when bound through Meleda channel, or on leaving the latter from eastward. After long-continued southeasterly winds, the currents are troublesome at the western entrance, and southerly winds cause a heavy sea; these winds frequently die away in the evening, and, therefore, caution is necessary in a sailing vessel to avoid the vicinity of outlying islets and dangers.

**Sabbioncello Channel** is used by coasting vessels only, which also frequently take that of Curzola, in order to keep near the shore when bound from the southward to Narenta or to Makarska. Vessels generally pass on the N. side of Torcola island, especially if the weather should appear threatening, in order to keep porto Grande under their lee. If unable to reach this anchorage in a violent bora, it would be advisable to proceed to port Lesina or to Torcola.

Neither the NE. or greco de Lesina channel nor Narenta channel are used in the course of ordinary navigation; they are chiefly frequented by coasters passing to Makarska on the mainland, or by vessels from stress of weather. It should be borne in mind that after easterly winds



the current generally sets eastward under Lesina island, and assists when bound to the mainland. With these winds it is advisable to give a wide berth to Sabbioncello peninsula, along which there is no good anchorage in case of emergency.

**Spalato Channel.**—Vessels bound to Spalato generally pass through this small channel. If on arriving from the southward the wind and current should be found unfavorable, a vessel may proceed to port Milna of Brazza, if far enough northward; otherwise, in order not to lose ground to Lesina, or if she be of light draught, to St. Giuseppe of Brazza.

Brazza channel, like all others near the coast, is exposed to most violent bora gales. The native mariners anchor every night under the mainland, and when under way keep near it, so that when unable to pick up an anchorage off it, they may be in a position to make one in Brazza island.

The small Zirona and Solta channels are seldom used; in the former a very strong current always sets on the shore; if a vessel from the westward should, after passing Planka point, take it with a fair wind on her way to Brazza channel, the Macina shoal in the western part of Spalato channel should be carefully avoided.

In the event of threatening weather from southerly winds in the neighborhood of Meleda, and not wishing to enter a port, there is anchorage in Meleda channel off port Mezza Meleda, in about 35 fathoms, sandy bottom, at  $1\frac{1}{2}$  miles from the shore. But it would be necessary to be prepared to get under way when the wind slackened, in anticipation of a bora gale. Shelter might also be sought in one of the ports southward of Curzola.

A sailing vessel from the eastward overtaken by a bora gale, and unable to reach the islands, should go on the port tack for anchorage on the Albanian coast. If signs of this wind should be perceived in the neighborhood of Narenta, or of Makarska, the coast should be closed and anchorage sought for as speedily as possible; but if surprised by it, it would be advisable to run at once for shelter to one of the ports eastward of Brazza. If overtaken at a few miles from the Zirona islands, the best measure would be to haul close to the wind on the port tack, and endeavor to fetch Lesina channel. In the event of the wind drawing ahead, as often occurs here, St. Giorgio of Lissa should, if possible, be reached; or if the vessel should be too far to leeward, she might proceed to Comisa bay, at the W. end of Lissa.

The bora, which varies in the vicinity of Planka point between N. and E., would probably be found on approaching the shore to blow in such violent squalls as to render it impossible to carry any sail. If a

bora be encountered in the Spalato channel, and it should be found impracticable to reach an anchorage in Canale Castelli, it might be convenient to anchor under Brazza island.

**Route to the Northward.**—When proceeding to any of the northern ports, and arrived off cape Linguetta, a course should be steered for Lagosta island, on the S. extremity of which, at an elevation of 342 feet, is a *fixed* light, visible 25 miles, and which is a good point of departure. The islands off Planka point are frequently obscured in southeasterly and southwesterly winds. Having passed Lagosta, a course should be shaped for Cazza islet, and thence to pass southward of Busi islet, or between it and Lissa; in the latter case guard against the currents which set with strength to the westward, and towards the eastern extreme of Lissa.

The above is the most prudent route at all seasons, but vessels bound to Ancona at times sight Pelagosa islet, which stands up like a column, and from the summit of which is shown a *fixed* and *flashing* white light, visible 18 miles. Pelagosa islet is about 30 miles northward of the shore of Gargano head. In this course during summer, it would be better to pass between Pelagosa and Lagosta, rather than between the former and Gargano head; for although at this time of the year the currents are usually weak, they may, after heavy rains, be found strong southward of Pelagosa.

In the vicinity of Ancona the southeasterly set is sometimes so strong that in light winds near the high lands sailing vessels frequently find difficulty in reaching this port, especially if care has not been taken to make the land well to the northward.

Vessels bound to Trieste or Venice, after reaching Lissa, usually shape a course to pass southward of the islands of Incoronata and Grossa, sighting the light on Blanche point, the NW. extreme of Grossa island, and continue for cape Promontore.

Between Lissa and cape Promontore, it will be well to keep rather close to the islands, in order to profit by the ordinary northwesterly current, and to keep in a position to reach one of the numerous sheltered localities in the event of a bora gale arising. Among these the chief are: port St. Giorgio of Lissa, on the N. side of the island; port Tajer, the open anchorage on the SW. side of Grossa, where a vessel may ride out a heavy gale; farther to the westward, the open anchorage under Premuda; port Lussin piccolo; port St. Pietro di Nembo, for small vessels; and the excellent anchorage of Unie channel, which has sufficient space for a fleet.

When abreast of the Great Quarnero channel be as near as possible to its entrance, so as to be enabled to proceed immediately to an anchor-

age on the occurrence of a bora, the violence of which wind from the gulf is such that a vessel might be unable to carry any sail, and having the Italian coast as a lee shore. With winds between SE. and SW. a heavy sea sets upon the coasts of the islands between Planka point and cape Promontore, and as the wind frequently lulls towards evening, the appearance of the weather should be carefully watched so as not to be too close to the shore. Besides other warning symptoms, gales from the southern quarter are preceded by a long swell from the eastward; in the winter season this swell continues some time after southeasterly winds have been succeeded by a bora gale.

The most remarkable object by day which is first seen after Grossa, is mount Ossero, in the form of a cone, 1,909 feet high, at the N. end of Lussin island. When farther N. the forked summit of monte Maggiore, 4,575 feet above the sea, the highest mountain of Istria will be seen. During sea breezes, particularly from the SE., or when they may be expected, the summits of the two mountains are always cloudy; during land winds and at the cessation of sea winds, they suddenly become clear.

Cape Promontore is dangerous, especially in thick weather, being low and bordered by shoals; having sighted it, or at night the *fixed* light on Porer rock, a mile to the SW. of the W. extreme of the cape, the vessel should be kept at a distance of at least three miles to the southward, until the sunken rock off it has been passed, especially in light winds and smooth water, as the current is then strong and sets with eddies in the direction of the shoals.

**Islands, &c., between Quarnero and Planka Point.**—The navigation of the channels formed by these islands, and which are frequented by small craft, is very difficult, for they are not only narrow, but strewed with rocks and shoals, which demand a thorough acquaintance; the bora, which is violent throughout the eastern coast, blows across them, and the currents are very rapid and changeable. Vessels of considerable draught in proceeding to the northward should keep outside the islands, unless bound to Zara or to Sebenico.

**Zara and Sebenico.**—When bound to Zara, or to Sebenico, after Planka point has been sighted, the islets abreast of Rogosnizza and Capocesto should be left on the starboard hand and a course shaped for Zlarin island.

The bora occasionally descends from the mountain valleys in the neighborhood of Sebenico with such violence that even when close under the land it is not practicable to reach one of the anchorages on the coast, and it becomes necessary to stand close-hauled on the port tack for Lissa or for Lesina. Southeasterly winds are sometimes troublesome

between Planka point and Sebenico, as they reach the channels, but, excepting in thick weather, shelter from these can always be reached.

In proceeding to Sebenico or to Vodice, the coast should be closed as much as possible, and after having passed the islets off Capocesto, a course should be shaped for one of the passages which have been described.

In proceeding to Zara from Planka point there are four passages; the best of these, and the one generally used, is the Zlarin channel, between Zmajan and Zlarin islands. It is the weathermost, and by taking it a vessel is enabled to reach easily Pasman strait, and also to anchor securely in case of a bora gale. In steering from the SE. for Zara through Pasman strait, the vessel's draught of water should be considered. The next preferable passage is between Zuri and Kakan islands, although the current is rapid and variable.

**Pasman Strait**, if taken on the way to Zara, should not be attempted without a commanding breeze, especially in a large vessel, as the currents often set towards the shore at the rate of three miles an hour.

**Ancona to Zara.**—Vessels bound from Ancona to Zara between Grossa and Melada islands, will observe the *fixed* and *flashing* light on Bianche point, the NW. extremity of Grossa island, and which marks the S. side of entrance to the passage. When arriving at the entrance, a good berth should be given to Bacili islets, and a course steered for Golac islet, which should be left a little on the starboard hand, and then between Ton Mali island on the NW., and Ton Veliki island on the SE. Having passed through, a course should be steered to round the NW. point of Uglian island, and thence for port Zara. If a bora gale should suddenly arise recourse may be had to the anchorage of Tre Sorelle.

If, after rounding Golac islet, it is intended to enter the Mezzo channel, the chart will be the best guide.

**Gulf of Quarnero.**—The currents are more affected in the Quarnero and among its numerous islands than elsewhere by the tidal wave, owing to the narrowness of egress for its waters; at times a sailing vessel can scarcely stem them without a fresh breeze in her favor. The bora also has great strength. The navigation of the Quarnero, although thus rendered difficult, is very important, owing to the commerce of Flume, Porto Re, Segna, Nona, Zara, and the islands.

There are two passages to the Quarnero channels for vessels of large draught: the Great Quarnero or main passage, being between the coast of Istria and Cherso island; and the Quarnerolo passage, between Asinello and Premuda islands.

**Great Quarnero Channel.**—Vessels from the westward usually take

the main passage which is marked by Galiola islet, and its white light tower about 70 feet high, and which exhibits a *fixed* and *flashing red* light. With a flood tide and fair wind the E. side of the passage should be preferred, as the current there sets to the northward during the whole of the flood; also when beating up with a commanding breeze, the eastern side should have the preference, as in the middle of the channel, and on the coast of Istria, the current sets to the SW. The wind veers to the eastward towards the middle of the passage, and is northerly in the vicinity of the coast of Istria.

If overtaken by a bora gale in the middle of the passage, it would be advisable, if far enough to windward, and the wind not too violent, to make for Cherso bay. Recourse might also be had to Ossero channel at the N. end of Lussin, or under the lee of cape Promontore, if not too far advanced.

**Quarnerolo Channel.**—The passage between Asinello and Premuda island is about four miles wide; nearly midway is the islet of Gruizza with a white light-tower on it, from which is exhibited a *fixed* white light varied by *red flashes*. The Quarnerolo channel is as much exposed as the Great Quarnero channel to the bora, but as the S. extreme of Lussin and Asinello islands afford some shelter from the sea, vessels are enabled, excepting in a gale, to reach anchoring ground, or to close the shore. Premuda, Skada, Isto, and Melada islands protect this channel from southwesterly winds.

**Route to Fiume.**—If bound to Fiume or to Porto Re, a course should be steered when inside the Quarnerolo for the channel between Veglia and Cherso; be prepared for a sudden blast of the bora when abreast of the passages southeastward of Arbe island. The currents vary greatly in rate and direction in the narrow part of the channels between Plaunick, Cherso, and Veglia islands, and are influenced considerably by the waters of the Fiumara or Rehra river. The wind is often favorable for leaving Fiume when the sirocco blows on the other side of the passes.

**Bocca di Segna** is generally taken when bound to ports Segna or Novi on the coast of Croatia. The current in this passage between Veglia and Pervicchio islands is so rapid, and the bora so fierce and sudden in its approach, that even with a fair wind it is prudent to keep under snug canvas. If unable to get through this pass, a vessel may anchor at port Veglia, or in Barbato channel, on the SW. side of Arbe island.

**Pago Channel** is usually taken by vessels proceeding to Morlacca channel. Carlobago is the only town of any importance on this part of the coast. If bound to Jablanaz, Arbe island should not be closely

approached, as there is a rocky bank with only one fathom water on it, at 600 yards from the SE. point of this island.

Morlaccia channel is only used by coasting vessels, which, in the bad season, secure every night. Squalls from the high lands bordering it are dangerous, and there is no good anchoring ground along the rocky Croatian shore.

Nona, on the mainland, is a town of but small importance; only vessels of light draught reach it by the New Pogliana channel between Pago and Puntadura islands.

In leaving the Quarnero no difficulties present themselves, as the wind generally, and the currents frequently, are favorable.

**Route to Trieste.**—After passing cape Promontore, the coast of Istria should be kept aboard, especially with contrary winds: the vessel will thus be in a better position for anchoring, if necessary, and the current sets northward when within a short distance of the land. Along the coast cape Brancorsa, the Brioni islands, Rovigno, and numerous other towns and villages, with the several light-houses, will be seen. Generally, the weather will be found finer and the water smoother to the northward of, and often on nearing, Rovigno.

Having passed Rovigno, a course should be steered for rounding Salvore point. Thence in clear weather, the whole gulf of Trieste will be open, and a course may be shaped for the town of Trieste.

Southeasterly winds frequently veer to the southward, N. of cape Promontore; occasionally, especially in winter, they become more easterly, then a bora may be expected. The high lands of Istria should be watched, and when they begin to be clouded, a place of shelter should be sought before the land becomes entirely concealed.

Frequently, vessels arriving off Salvore point with a fair breeze meet contrary winds. In this case, if the weather be not threatening it is advisable to stand to the northward on the starboard tack, when the vessel will probably break-off, and lay well up on the opposite tack. The lead should be carefully attended. Between Timavo and Grado, it is not safe in a vessel of moderate size to stand in to less than  $5\frac{1}{2}$  fathoms water, within which the soundings decrease suddenly.

The bora is very violent in the gulf of Trieste. SW. and SE. winds, which blow dead upon the Venetian coast, are equally dangerous, but not so frequent.

If overtaken by a heavy bora northward of Salvore point, and unable to reach Pirano anchorage, it would be necessary to bear-up for Umago, which is well protected by Salvore point. It would not be safe to anchor on the open coast between Salvore point and Trieste.

If unable, from the violence of the gale, to hold her own, when between

Salvore point and cape Promontore, a vessel may anchor within about six miles of the coast of Istria; outside of this there would be a heavy sea in bad weather; or in case of emergency she might, without great danger, anchor between Rovigno and Salvore point, as far as 18 miles from the shore, in 16 to 18 fathoms, which would be preferable to the risk of being driven on the coast of Italy.

If, on entering the gulf of Venice at night, a SW. gale should arise, it would be advisable to keep an offing until daylight.

As pilots, when required, were formerly taken off Rovigno, it was from this place that vessels usually took their departure for Venice, or for the ports of the lagoons; and it is always prudent to sight and take a departure from the Istrian coast, where also favorable weather may be awaited for approaching the shores of Venice.

Seamen are warned to accept with caution the services of pilots, as in consequence of the existing excellent charts, increased number of lights, buoys, and beacons, the authorized pilots have been discontinued.

**Venetian Coast.**—Caution is necessary in approaching this coast in sailing vessels, especially with obscure weather, when it is inadvisable to sight it. Vessels of heavy draught which cannot enter the ports should not close the shore in strong southeasterly or northeasterly winds, or when a long swell is setting in. Proceeding from Istria to Molamocco, the only port in the lagoons for a large vessel, a course should be shaped to allow for the southerly set of the current near the western shore; and great attention should be paid to the soundings. At night it would not be prudent to stand in to less than from six to eight fathoms, which depth is about  $1\frac{1}{2}$  miles from the shore.

The currents are rapid after rainy weather, and the shoals at the entrances to the ports are affected by them. In the early part of the day, during summer, land breezes enable vessels to secure a favorable position for entering with the sea breeze, which sets in rather regularly from SW. or from SE.; from the latter quarter, often suddenly, and with considerable strength, and if a long swell should be experienced, and the land be overcast, and there should not be time for the vessel to reach her port, one of the anchorages on the coast should be taken for the short period during which, at this season of the year, a southeaster may be expected to last.

In the winter, the bora and southeasterly winds render the navigation of the coast between Piave and Maestra point almost impracticable, and the coasting vessels then pass by the channels, from Goro bay to Venice.

In the summer, it may be convenient for vessels to anchor along the

Venetian shore at the distance of two or  $2\frac{1}{2}$  miles, in from six to seven fathoms, or farther off if necessary. The best anchorages are those of Pelorosso, Piave, Vecchia, and Cortellazzo. At Pelorosso, a vessel can more conveniently proceed to sea on the approach of bad weather. It is sometimes convenient in fine weather to anchor here until daylight to enter Malamocco.

**Trieste to Venice.**—It is customary, when bound to Venice from Trieste, to coast along the land from Grado, on account of the southerly current; this precaution is necessary so to avoid the vicinity of Maestra point. Care is also required in leaving the lagoon ports, especially Chioggia, after leaving which a depth of 11 to  $13\frac{1}{2}$  fathoms should be preserved until Maestra point has been passed.

**Ancona to Venice.**—The coast should not be approached between Venice and Rimini, to within a less depth than 16 or 17 fathoms. Southward of Rimini the soundings increase, and a nearer approach may be made, especially when proceeding southward, for the sake of the inshore current; and in calms or land winds, a vessel may anchor in about 11 fathoms, three miles from the coast.

**Ancona to Trieste.**—Cape Promontore should be sighted, and the shore of Istria coasted; allowance being made on the way for the probability of being set to the southeastward by currents.

**Manfredonia.**—The gulf of Manfredonia affords the best refuge on the W. coast from a bora, and would be probably within reach if a gale from this quarter should arise while southeastward of Lissa. The high land of Gargano is an excellent mark, and as soon as the mount is seen by a vessel from Cattaro, or Ragusa, a course should be shaped to bring it a little on the starboard bow; but if the gale should overtake the vessel when beyond Lagosta, she should at once haul as close to the wind as expedient on the port tack, in order to weather the eastern extremity of Gargano head.

**Tremiti Islands.**—If overtaken by a bora too violent for the vessel to be kept at sea, when westward of Lissa and unable to fetch Manfredonia, an attempt should be made to reach Tremiti islands; failing in which there would be no resource but the entirely exposed anchorages on the Italian coast.

The islands are low; but in weather such as generally ensues during a gale from this quarter they may occasionally be seen at a distance of 10 miles. Care should be taken to verify the vessel's position before making for the Tremiti, in order to insure clearing the low and dangerous Pianosa islet, which is only 50 feet high.

On leaving Tremiti islands or Manfredonia for the coast of Dalmatia, or to proceed farther up the Adriatic, the Dalmatian shore should be



closed as speedily as possible, especially in the winter season. If bound to the westward, the passage between Pelagosa and Pianosa isles should be taken; St. Andrea and Pomo islets, and mount Hum of Lissa island, should be passed within view. When bound from Manfredonia to the neighborhood of Cattaro in the bora season, it is advisable to sight Lagosta island.

**From Trieste Outwards.**—If outward bound from Trieste, or from Venice, or from the coast of Istria, it is customary to make cape Promontore as a point of departure, especially in the autumn and winter seasons. The islands between it and Lissa should be coasted, following the directions given for proceeding to the northward, but keeping, in fine weather, farther from the shores to avoid, in some measure, the strength of contrary currents. Lagosta island or the light will be seen and thence a direct course out of the Adriatic may be shaped. In summer, if the weather should promise to be fine, vessels may venture to keep on the Italian shore for the sake of the southerly current.

On leaving Ancona in the winter season, either for the eastern coast or to quit the Adriatic, the islands should be closed as soon as possible. The current will be found setting to the SE. during the first part of the route, and more southerly near the middle. In moderate weather, and approach of summer, a course may be shaped northward of Pomo islet or rock, in order to sight Lissa, but if bad weather should be apprehended, it would be advisable to make at once for Grossa island, and then coast along the islands.

On the Italian coast in summer, vessels will be almost always assisted by land breezes during the night and early part of the day, as well as by the currents, which are, however, feeble at a short distance from the shore; and in light contrary airs the anchor may be dropped at two or three miles from the land, between Ancona and Gargano head, and even as far as cape Otranto. As the coast is generally low, great attention should be paid to the soundings; at night a vessel should not stand in to less than nine or ten fathoms water, and if signs of a bora gale should be perceived, it would be prudent, even in summer, to stand off at once. Tremiti islands, or Manfredonia, might then be convenient anchorages to resort to, or Brindisi, if the vessel should be to the southward of Gargano head.

In winter the Italian coast should be avoided as it is dangerous in a bora gale, from which it affords no shelter. Nevertheless, this wind does not always blow home with violence on the Abruzzo coast, owing to the high lands which border it, and where during heavy weather in the offing the land breeze often continues throughout the night.

In the Adriatic sea, more than in most localities, it is of importance

to watch atmospheric appearances; and it is seldom that the attentive mariner may not observe some premonitory symptoms of the winds most to be apprehended.

**VESSELS MARKING WRECKS.**—When light-vessels or other craft are placed to mark the position of wrecks in the ports and roadsteads, and on the coasts of the kingdom of Italy, they will be distinguished as follows, in order that mariners may be able to learn on which side of them they should go :



Vessels marking wrecks will have their top sides colored green, and will exhibit—

**By day.**—Three balls from a yard, 20 feet above the sea; two placed vertically on the side that shipping may safely pass, and one on the other side.

**By night.**—Three *fixed* white lights, similarly arranged, but the ordinary riding light will not be shown.

Mariners will thus know on sighting a wreck-marking vessel that she is so employed; and that they should pass on that side of her on which the two balls or two lights are shown.

## CHAPTER IV.

### COAST FROM CAPE SANTA MARIA DI LEUCA TO TRONTO RIVER.

VARIATION in 1883: Cape Sta. Maria di Leuca,  $8^{\circ} 34' W.$ ; Tronto river,  $10^{\circ} 30' W.$

The western shore of the Adriatic sea between cape Sta. Maria di Leuca and Tronto river, except the easternmost portion and Gargano head, is generally low, but of easy navigation in the summer season.

**CAPE Sta. MARIA di LEUCA** (ancient *Salentinum prom.*), the heel of what is called the boot of Italy, is the eastern point of the gulf of Taranto and the western extreme of the entrance to the Adriatic. It is about 520 feet above the sea, and is easily recognized from the southward by a church, a white signal tower, and a group of houses on its summit, and at night by the light; it juts out a considerable distance to the southeastward, sloping down gradually to the sea. On the cape is an electric telegraph semaphore.

The shore, between  $4\frac{1}{2}$  and 13 miles westward of the cape, should not be approached, as it is bordered by shallow rocky ground, on the southern edge of which are two sunken rocks, named Giumenta and Cavallo, the outer lying about W.  $\frac{3}{4}$  S.  $2\frac{2}{10}$  miles from Pali tower, and SSW.  $\frac{1}{2}$  W. two miles nearly from Mozza tower. In ordinarily clear weather the features of the land in this vicinity are sufficiently distinguishable at a distance of five or six miles, but at times it is enveloped in heavy clouds.

**LIGHT.**—On the slope of the cape is a white light-house, from which at an elevation of 335 feet above the sea is exhibited an *intermittent* white light which attains its greatest brilliancy every *half minute*, and is visible in clear weather from a distance of 25 miles.

**ANCHORAGE.**—There is excellent shelter for vessels driven from the northward by a bora gale, in a small bay on the W. side of the cape, between it and Ristola point; SE. and SW. winds send in a heavy swell, but those between NE. and W. are little felt. The best anchorage is at the entrance, in from nine to 11 fathoms, sand, the church bearing ENE.  $\frac{1}{4}$  E. and Uomo-morto tower NW. by W.  $\frac{3}{4}$  W., the extreme of cape Sta. Maria di Leuca being just open.

As heavy bora squalls reach this anchorage, vessels with the wind from this quarter moor with open hawse to the northward, and a good scope of cable.

The **COAST** between cape Sta. Maria di Leuca and cape Otranto, 20 miles to the NNE., consists chiefly of well cultivated rocky elevations on which are numerous villages and towers; of the former near the cape, Gagliano is conspicuous. The shore is almost everywhere bold, with soundings of 11 to 17 fathoms close-to, which increases to 36 and 54 fathoms near cape Sta. Maria di Leuca. The small bay of Castro is the only anchorage along it which affords even temporary shelter, the town of which is easily distinguished; and as, moreover, the southerly current is usually strong, a vessel should not close this part of the coast excepting when leaving the Adriatic with a commanding breeze.

The numerous towers, erected at intervals for defense in former times, are convenient guides for coasting vessels; the most conspicuous of these buildings are Montelungo telegraph, about  $1\frac{1}{2}$  miles northeastward of Sta. Maria di Leuca light-house, then follows the towers of Novaglie (in ruins) and Specchia grande, port Tricase, and the towers of Sasso and Andrano, the latter being 10 miles from the light-house; port Tricase is indicated by some houses on the beach and accessible to boats alone.

Sasso tower is about one mile from Tricase; between it and Andrano, and on a height above it, is the tower of the abbey of St. Maria di Mito.

**Port Castro.**—Mugurone, or Maccarone point, about  $12\frac{1}{2}$  miles northward of cape Sta. Maria di Leuca, is steep, rocky, and projecting to the southeastward forms port Castro, the town of which stands about 320 feet above the sea, and a third of a mile N. of the point; the anchorage here is sheltered from N. and westerly winds, but much exposed to those from E. and SE. Vessels anchor about half a mile southwestward of Mugurone point, in eight fathoms, mud and weeds, the town bearing about N.  $\frac{1}{4}$  E. The anchorage is used by vessels, in the fine season, when unable to beat into the Adriatic against the current during long continued northwesterly winds.

**Water** may be obtained about a mile southwestward from the anchorage, at a narrow stream which flows into Cala dell' acqua viva, or fresh-water creek.

**Port Badisco** is a small narrow inlet about  $5\frac{1}{2}$  miles northward of Castro; between them, at two miles from Castro, is the tower and port of Miggiano. Port Badisco has only sufficient space to shelter a few vessels of light draught, moored head and stern, sheltered from westerly and northerly winds. The inlet trends to the NW., and is in some measure sheltered from on-shore winds but exposed to those from the SE., which cause a considerable sea. The place will be known by St. Emiliano tower, which is to the northward of Badisco, and near it are two or three rocks above water; about  $2\frac{1}{2}$  miles beyond Badisco is cape Otranto.

**CAPE OTRANTO** is the E. extreme of a mass of high precipitous table land, the frontage of which is  $1\frac{1}{2}$  miles in extent; on the cape is the tower of Palascia, and about 500 yards NW. of the cape is a semaphore with an electric telegraph, and on the point below these buildings is the light-tower rising from the keeper's dwelling, which is square. Orto point, the northern extreme of the high land, has a tower on it, in a ruinous condition; to the southward of it will be seen the buildings of S. Nicola di Casole, and to the northward of the tower is that of Cucurizzo, and the town of Otranto.

Close to the S. of Orto point is Posta della Fasci, projecting more eastward, and forming on the S. a bay about half a mile deep, the shore of which is skirted by rocks above water, and rocky ground, with three to five fathoms water, extends off nearly 650 yards. To the southward of the rocky ground, and a short half mile from the point S. of Posta della Fasci, there is anchorage with off-shore winds, in five or six fathoms, sand and shells; the shoal water is steep-to, there being 25 fathoms near it.

**LIGHT.**—From the white circular tower on cape Otranto, at an elevation of 197 feet above the sea, is exhibited a *fixed* white light, visible in clear weather a distance of 11 miles.

**PORT OTRANTO** (ancient *Hydruntum*), at nearly three miles NNW.  $\frac{3}{4}$  W. of the cape, is a bay, about three-quarters of a mile wide, formed between St. Nicola point on the SE., and Craul point, which is low and rocky, on the NW. St Nicola point, the inner portion of which is rather elevated, terminates in a chain of rocks awash, and affords some protection to the port against easterly winds.

Secche, a sand bank with several rocks awash, lies about 250 yards northwestward from the rocks off St Nicola point, and contributes to the protection of the anchorage from northerly winds; between the two is a passage with a depth of  $3\frac{1}{2}$  fathoms.

The town of Otranto, which contains about 2,000 inhabitants, is now of small importance. It stands on a rocky site on the S. side of the bay, protected by surrounding walls and a castle. Very little trade is carried on here, the only export being agricultural produce. Coasting vessels are constructed on the beach. Otranto is in communication with Corfu by submarine telegraph cable.

Small supplies are plentiful, and spring water can be obtained at the NW. bastion outside the town.

The anchorage of Otranto, which is fit for small vessels only, is between St. Nicola point, the Secche, and the town, in three to four fathoms, weeds and bad holding ground; the bottom is rocky on the NE. and SW. sides. Northeasterly and easterly winds send in a considerable sea

but the shelter from N. round by W. to SE. is very good. Vessels not intending to enter the port anchor in from six to 10 fathoms outside.

**Directions.**—The steeple of Lecce cathedral, about NW.  $\frac{1}{4}$  W. 19 $\frac{1}{2}$  miles from Otranto, is the first conspicuous object which presents itself in clear weather to a vessel bound to the latter place from the Adriatic; when approaching from southeastward the high land of cape Otranto, the several towers, the semaphore of Palascia, and the light-house below it, will be seen. After passing the cape, the buildings on the W. side of the bay, and afterwards the town and its castle, will be easily recognized. The town should be steered for when seen; the Secche, and the rocks projecting from St. Nicola point, will become visible, and with a commanding breeze between N. and E. the passage between them, having a depth of 2 $\frac{1}{2}$  and 3 $\frac{1}{2}$  fathoms, should be taken, borrowing rather on the Secche side. In taking this passage, a vessel should haul-up promptly to starboard after rounding the shoal, as the depth decreases rapidly to the southward.

It is impracticable to beat into Otranto against westerly and south-westerly winds, owing to the shallowness of the S. and SW. parts of the bay; a good anchorage in five or six fathoms, sand, will be found between the Secche and the NW. point; but the vessel should get under way at the first symptom of a breeze from seaward.

Bora gales occasion a very heavy sea in the bay, and it would be unsafe when this wind is threatening for vessels to attempt to enter. In such a case every endeavor should be made to weather cape Otranto, and then to proceed under easy sail to the anchorage under cape Sta. Maria di Leuca.

**La Scala** is a rocky shoal, 600 yards in length N. and S., with 6 $\frac{1}{2}$  fathoms water, and on which the sea breaks in heavy weather. The shoalest part lies 1,100 yards from Craul point, with the building over the sandy bay N. of it bearing about WSW.  $\frac{1}{4}$  W. and the town castle SSW. Vessels approaching Craul point from the northward should give the shore a berth of three-quarters of a mile until southward of the shoal.

**The COAST** from cape Otranto to Orso tower, a distance of 11 miles, trends NNW., thence to cape Cayallo, 29 miles NW.  $\frac{1}{4}$  N.

From Otranto to near San Cataldo point it consists chiefly of rocky, wood-crowned elevations, with richly cultivated ground, especially in the neighborhood of the former; it then presents a low level outline and marshy country, without a single dwelling southward of Brindisi; the steeple of Lecce, which stands on a hill six miles inland, is the only conspicuous object, until the shore is closely approached, when some towers, which mark the temporary anchorages of coasting vessels, become visible.

At about one quarter of a mile from the land the bottom is sandy; at one mile it is muddy, beyond which distance it becomes rocky, with patches of mud. In fine weather vessels may without risk coast along at a distance of one mile.

The shore is all along bordered by a bank, which extends off in places nearly half a mile, with scattered rocks here and there.

**Anchorage.**—It is seldom quite safe to anchor off this unprotected coast. Small vessels, however, come to temporarily at the following places:

**Alimini** is a sandy bay, about four miles northwestward from Otranto, and abreast of a lake of this name; the best berth is about half a mile from the shore, in  $7\frac{1}{2}$  fathoms, with the ruins of Fiumicelli, the second tower beyond Otranto, bearing N.  $\frac{3}{4}$  W. one mile. Vessels also anchor farther out in 10 to 13 fathoms.

The Secca Missipezza, a rocky shoal with 16 feet water on it, lies NE. distance a short mile from Fiumicelli tower, and about three-quarters of a mile from the shore, with 20 fathoms close to it.

**Orso.**—This anchorage, eight miles northward of Otranto, is marked by a tower, and by a church a quarter of a mile from the shore. It is a small bay, in which a depth of four fathoms good holding ground will be found between the tower northwestward and the S. point of the bay eastward.

To the northward of Orso tower are those of Rocca Vecchia and Specchia Ruggieri; the coast northward of the former tower and nearly as far as San Cataldo point is bordered here and there by scattered rocks awash. Near Rocca Vecchi tower are a small church and the ruins of a few houses.

**San Cataldo** anchorage is southeastward of the tower which stands on the sandy point of the same name, and bears about ENE.  $\frac{1}{4}$  E. from the town of Lesce. The anchor should be dropped in three or four fathoms, sand, at about half a mile to the SE. of the light-house or tower, and rather more than 600 yards from the shore. Large vessels anchor about three-quarters of a mile to the SE. of the light-house, and nearly the same distance from the shore, in  $6\frac{1}{2}$  or seven fathoms.

**LIGHT.**—At about 120 yards within the extremity of San Cataldo point is a yellow square tower rising from a large house, from which at an elevation of 56 feet above the sea is exhibited a *fixed* white light, visible seven miles.

**San Gennaro.**—At nearly  $2\frac{1}{2}$  miles northward of San Cataldo point is Veneri tower;  $3\frac{1}{4}$  miles beyond the latter is that of Chianca; then follows Rinalda and Specchiolla towers.

Vessels also bring-to southeastward of San Gennaro tower, which is

2½ miles from that of Specchiolla, the depth being four fathoms, mud and weeds; and finally about a mile to the southward of cape Cavallo, SE. of Brindisi, where good shelter from NW. and off-shore winds will be found in three or four fathoms, sand.

**BRINDISI** derives considerable importance from its being the most eastern port in Europe, whence the mails are embarked for India, China, and Australia; it is the best anchorage for large vessels on the western shore of the Adriatic, and is conveniently situated for vessels bound to the Albanian coast, or to the Ionian islands. Cape Cavallo, a low projection marked by a tower on its extremity, and Penna point or cape Gallo, a prominent elevation, 4½ miles to the NW. of it, form the extremes of the bay. The roadstead is partially protected from easterly winds by the Padagne rocks, and shoal ground connecting them to the main, and by the two islets of Castello and S. Andrea, and extends south-westward about 1½ miles, to the fork of two channels which nearly surround the town and form the port.

The town of Brindisi (ancient *Brundisium*), and the scene of many remarkable historical events, now contains about 9,000 inhabitants, and is the see of an archbishop, but the cathedral is much dilapidated. At the NW. corner of the wall, which partly surrounds the town, is the castle, flanked by huge round towers and conspicuous from all sides.

The northern and eastern sides of the town are faced by good quays, with a railroad running along the latter having its terminus close to the health office. Between the health office and a Roman column on the N. side of the town is a slightly projecting wharf, used by the Peninsular and Oriental steamers, and having near it a depth of 26 feet of water. On the northern shore of the western arm of the port, opposite the NE. side of the town is a Government wharf, and the Peninsular and Oriental coal depot, where a large quantity of coal is always maintained.

Although the port of Brindisi has been much improved the last few years, there is but little trade carried on, the port dues being very expensive, amounting to one franc a ton; the consequence is, that nearly all the oil obtained in this oil producing district is shipped at Gallipoli, which is comparatively a free port. A few coasting vessels are built here. A British consul resides here, and consuls or consular agents for most nations. It is the most convenient port for travelers to and from the East, and 12,000 to 13,000 passengers land and embark yearly. Brindisi is in communication with all Europe by means of the electric telegraph.

The principal imports are wine, beer, spirits, petroleum, cattle hides and skins, cotton manufactures, wool manufactures, raw silk, coral, iron rails, and coals; and the exports are olive oil, dried fruit, silk manu-



factured, corn, flour, haberdashery, medicinals, glass and earthenware. The total value of the imports for the year 1875 amounted to 273,000*l.*, and that of the exports to 368,200*l.*

There is a large Italian Government dock-yard at Brindisi.

**Supplies.**—Fresh provisions of all kinds are plentiful, and water is obtained from a fountain near the custom-house.

**Harbor.**—The entrance to the harbor is at the SW. end of the inner roadstead, the passage to it being a narrow channel, which is 500 yards in length, but only about 110 yards wide. This channel, which is between walls, and has a depth of 26 to 30 feet in the middle, divides into two arms at its inner end, one running along the NW., and the other along the SE. side of the town. The former and wider is nearly a mile long, with a depth of from 22 to 27 feet, shallowing towards the head; the latter has from 26 to 36 feet water, muddy bottom as far as the southern end of the quay, when the channel narrows and becomes shallower to the head, where a dock is proposed to be constructed. The eastern shore of this arm is bordered by a shallow bank, which extends off nearly 133 yards, the deep water channel abreast of the Peninsular and Oriental wharf being only a little more than 100 yards wide.

Vessels proceeding alongside the wharf at the town to coal should use great caution, as from the falling in of the roadway in some places the depth of water is much reduced.

Vessels generally haul in close under the NW. wall, so as to shut in the channel forming the entrance to the port.

**The Roadstead** may be said to be divided into two parts, an inner and outer; the former comprising the small space to the westward of the buoys marking the outer extreme of the shoal off Castello islet, and that extending from the rocky point on the mainland S. by W.  $\frac{1}{4}$  W. of it. Large vessels generally anchor on the western side, in about 5 $\frac{1}{2}$  fathoms, mud, with fort Mare mole light bearing about ENE.  $\frac{1}{2}$  E., and the green light on the mole at the SE. side of entrance to the port SW.  $\frac{3}{4}$  S. or SW.  $\frac{1}{2}$  S. In the southern part of this anchorage is a shoal spit projecting 300 yards N. by W.  $\frac{3}{4}$  W. from the point next eastward of the entrance of the harbor; on the point are several buildings.

It is reported that a rock, with only two feet water on it, lies nearly in line between the iron light post on the S. side of entrance to the harbor and the black bell buoy, and about 400 yards from the latter. Also, a rock awash slightly inside the same line, and nearer the light post.

Vessels bound through the roadstead for the harbor should, from between the buoys, steer so far westward as to have the column on the N. quay of the town well open, before keeping away for the harbor.

The outer road is between the Pedagne rocks and Castello islet, with depths of from seven to 10 fathoms, principally rocky bottom. It is open to N. and NE. winds, and easterly winds are troublesome, but with these latter winds, the Pedagne rocks protect it from a very heavy sea. In the SW. part of the road, 600 yards from the shore, is the Arco rock, with only  $16\frac{1}{2}$  feet of water on it, and six to seven fathoms close round; from the rock, fort Mare mole light-house bears NW. by W.  $\frac{1}{2}$  W., and Traversa or Pedagne light-house NE. by E. easterly. The best anchorage in the outer road, is six to  $6\frac{1}{2}$  fathoms, about a quarter of a mile eastward of fort Mare.

Vessels of light draught anchor in four or five fathoms, on the W. side of Castello islet, laying out a cable to it. Easterly winds alone are troublesome at this anchorage, but the Pedagne rocks protect it from the heavy seas.

**The Pedagne Rocks** are five low rocks covering a space of more than 1,200 yards in a NW. by W.  $\frac{3}{4}$  W. direction. They extend nearly three-quarters of a mile NNW.  $\frac{3}{4}$  W. of cape Bianco, and, with the shallow rocky bank by which they are connected to that cape, afford protection from the eastward to Brindisi roadstead. The five-fathom line of soundings passes within the distance of 200 yards on the N. side of the rocks, but the space between them and cape Cavallo,  $1\frac{1}{4}$  miles to the SE., is all shallow water, which extends northward nearly a mile from the shore, and at 1,100 yards E.  $\frac{1}{4}$  S. from the eastern rock is a rocky patch with  $2\frac{1}{2}$  fathoms on it.

At 600 yards N. of the tower on cape Cavallo is the Piatti rock, above water, and 450 yards ENE. from the cape is the rock of the same name. Cape Cavallo being surrounded by shoal rocky ground should not be approached nearer than a long mile, or into a less depth than 15 fathoms.

**St. Andrea and Castello Islets**, forming the western side of the outer roadstead, are connected by a bridge; the eastern and N. sides of St. Andrea are bordered at a distance of 300 yards by rocks and shallow water, with four fathoms close outside.

On the southern end of Castello is fort Mare and a semaphore, with a mole or breakwater, extending 250 yards in a SSE.  $\frac{1}{4}$  E. direction.

A breakwater connects the N. end of St. Andrea islet with a point of the mainland westward, forming within it on the S. a small well-sheltered anchorage for moderate sized vessels, in from four to six fathoms water, on the islet's side, with a cable to the shore. The western shore is bordered at the distance of about 250 yards by a bank.

Between the S. end of Castello islet and the end of fort Mare breakwater, a bank of sand, with patches of rocks and weed, extends westward and on the western edge of the bank is a rock awash.

**Buoys.**—A white buoy with staff and flag marks the SW. extreme of the bank extending from the S. end of Castello and breakwater.

Fico shoal extends 350 yards northward from the rocky point, nearly half a mile eastward of the entrance to the channel leading to the harbor, having on its outer part only 15 feet water; in the middle of the shoal and about 100 yards from the shore is the Fontanella rock above water. A black bell-buoy is moored in about four fathoms, nearly 100 yards outside the shoal, and 400 yards from the shore. This buoy must be left to port in entering. The passage between it and the white buoy near fort Mare is about 300 yards wide.

Also, a buoy painted white, with red bottom, and marked "Boa di Tonneggio" (mooring-buoy), lies in  $19\frac{1}{2}$  feet water, with the iron column of the *green* light bearing SW.  $\frac{1}{4}$  S., Zaccari farm SSE.  $\frac{1}{4}$  E., and light column on the S. end of fort Mare mole ESE.  $\frac{1}{2}$  E. The buoy is for the use of vessels having to approach the quarantine ground, but it is not intended for large ships.

**LIGHTS.**—**Pedagne Rock.**—From a circular white tower on the NW. Pedagne rock is exhibited at an elevation of 69 feet above the sea, a *fixed* white light, showing a *flash* every *three minutes*, and visible in clear weather at a distance of 13 miles.

**Fort Mare.**—From an octagonal tower in fort Mare, Castillo islet, is exhibited at 106 feet above the sea a *fixed red* light, visible six miles.

**Fort Mare Mole.**—From the end of fort Mare mole or breakwater, at 33 feet above the sea, is shown a *fixed* white light, visible six miles.

**Inner Harbor.**—From an iron column on the small mole at the E. side of entrance to the inner harbor is shown a *fixed green* light, visible five miles. This light is visible only in the entrance to the port.

Also from a tower on the N. quay of the town is a small *fixed red* light. The *red* light a little open to the right of the *green* light leads up to the entrance of the narrow channel and into the harbor.

**Penna Point.**—On Penna point, or cape Gallo, is a circular white tower, from which at an elevation of 129 feet above the sea is exhibited a *fixed* white light, varied by a *flash* every *half minute*, and visible from a distance of 15 miles.

**DIRECTIONS.**—The land in the vicinity of Brindisi, being very low, is sometimes difficult to recognize, especially in southerly winds, when it becomes obscured, and it is then necessary to keep the lead going. Between Otranto and Brindisi, depths of 55 to 50 will be found from six to seven miles from the land, and on nearing Brindisi the bottom becomes weedy abreast of cape Cavallo; hard mud off Penna point, or cape Gallo; and rock, sand, or gravel between them.

The steeple of Lecce cathedral, 20 miles to the southward of Pedagne

light tower, is, even in clear weather, the only object which can be distinguished, till a near approach, by vessels from the eastward or south-eastward. If arriving from the northward or northwestward, Penna tower and light-house, on the extremity of the high rocky point of the same name, will be the objects first seen on the low coast, which is not visible beyond seven or eight miles. In the vicinity of the harbor Pedagne light-house, fort Mare, and Cavallo tower, a round building on the extremity of the cape, will be successively seen.

From the NW., after passing Penna point, which should not be approached too closely, steer for Pedagne tower or light, taking care not to bring it eastward of a SE.  $\frac{1}{4}$  E. bearing nor cape Cavallo tower to the southward of it, to avoid the shoal water that extends nearly half a mile from the shore midway between Penna point and St. Andrea islet. When the end of fort Mare mole or the white light on it bears SW.  $\frac{1}{4}$  S., a vessel being then eastward of the rocks bordering St. Andrea islet and in the fairway of the entrance to the port, alter course and bring the light on the starboard bow, so as to pass about 100 yards SE. of it, and then steer in between the white buoy on the N. and the black bell buoy on the S. to the westward until the column on the N. quay of the town is well open of the eastern side of the channel to the harbor; then proceed in midway, taking care to keep rather on the western side to avoid the bank bordering the shore on the eastern side of the harbor.

Coming from the SE., care must be taken not to bring Penna point light-house to the northward of WNW.  $\frac{1}{4}$  W., nor go into less than 15 fathoms water, to avoid the shoal ground off cape Cavallo, which will be cleared when fort Mare is well open northward of Pedagne light-house bearing W.  $\frac{1}{4}$  S. When fort Mare light-house (*red* light) bears SW. by W.  $\frac{1}{4}$  W. steer for it until Pedagne light-house bears SE. by E.  $\frac{1}{4}$  E.; the beacon or white light on the end of fort Mare mole may then be steered for and passed as before.

By night proceed as above until passing between the buoys at the entrance of the inner roads, when, if wishing to enter the harbor, the *red* light on the N. quay of the town should be brought a little to the westward of the *green* light at the SE. side of the entrance; the channel will then be opened, and may be steered for.

In leaving the harbor, the column on the N. quay should not be shut in with the eastern side of the channel to the harbor, until abreast or northward of the bell buoy, so as to avoid the shoal ground extending from the E. side of entrance to the bell buoy.

**The COAST** between Brindisi and Gargano head is generally low, mount Gargano being the only mark for vessels making for the land

until approaching within 10 or 12 miles, when in clear weather the towns, villages, and towers scattered along the shores, many of them on eminences, will be distinguished.

Between Brindisi and the vicinity of Barletta, about 87 miles to the NW., there are numerous towns, each of which has a small port frequented by coasting vessels. At Monopoli the flat country disappears, and the land maintains a moderate elevation, with patches of cultivation to near Barletta, beyond which, and as far as Manfredonia, sandy marshes prevail, which, together with Salpi lake, render the climate rather indifferent for habitation. This coast may be safely navigated at the distance of a mile, and, in fine weather, with land winds, even large vessels may temporarily anchor at about this distance from it, in 18 or 17 fathoms, hard mud.

**Anchorage.**—Although the harbors on this coast are accessible to small craft only, there are tolerable summer anchorages abreast of some of them, and a short description of these and of the various points of recognition scattered along the shore will be useful. Penna light-house, about three miles to the NW. of Pedagne light-house, is a good guide to vessels bound to Brindisi from the northward.

Carovigno and Ostuni towns, both on elevated ground, are good marks when making the land between Brindisi and Monopoli, and bound for the anchorage off Villanova, or elsewhere. These towns are 15 and 18 miles respectively from Brindisi, and about three miles inland. Ostuni is fortified.

Small coasting vessels, which can, if necessary, haul up on the shore, anchor at a short distance from it during fine weather in the creeks known by the towers; among other places, to the westward of Penna and Testa towers, to the southward of Guaceto or Vacito tower, and off Sta. Sabina and Pozzelli towers.

The tower of Villanova is about 20 miles from Brindisi, and nearly N. of the hillock on which stands the town of Ostuni; the place is visited by small craft only, which anchor near the tower close to the shore.

St. Leonardo tower is nearly  $2\frac{1}{2}$  miles from Villanova, and  $3\frac{3}{4}$  miles farther on is the tower of Canne; at  $4\frac{1}{2}$  miles beyond the latter is Egnazia point, upon which are the ruins of the ancient town of this name; and then follows the tower of Cindola, close to which is a boat creek. Between this tower and Egnazia, boats can without difficulty haul up on the shore, a convenience not afforded by any portion of the coast within four or five miles to the northward of the tower.

St. Stefano tower is next to Cindola; at St. Stefano is a small inlet for fishing-boats; it is two miles southeastward of Monopoli, and may be recognized by a large edifice on an eminence close to the sea.

**Port Monopoli** is a small inlet rather more than 300 yards deep, with one or two little coves, and rather less than 250 yards wide; it is exposed to northerly winds, and the holding ground is bad. Small vessels anchor in six to 10 feet, rock, with warps to the shore. A mole forms the E. side of the port, which improves its small natural capabilities. Large vessels anchor in fine weather abreast of the town.

The town stands amidst olive, lemon, and orange plantations, on rather elevated ground; the outer portion of the walls which surround it being washed by the sea. It contains about 15,000 inhabitants, and is defended by a castle, from which the mole projects to the N. Oil is exported in considerable quantities, and the contiguous lands are fertile, well cultivated, and present a picturesque appearance.

**LIGHT.**—A *fixed* white light is shown from the mole head at port Monopoli, visible six miles.

**Polignano.**—This small port,  $4\frac{1}{2}$  miles from Monopoli, is fit for boats only. The town is on a steep craggy rock surrounded by olive trees, and at the foot of which is a fine spacious cave.

Between Monopoli and Polignano are Orto and Ancina towers; beyond these is St. Paolo, a rocky islet, on which are the ruins of a monastery. St. Vito tower, which has a large building to the southward of it, is  $1\frac{1}{2}$  mile to the NW. of Polignano; beyond it is Rapagnola tower on a projecting point, and four miles farther is the town of Mola.

**Mola.**—Coasting vessels anchor either to the E. or to the W. of Mola. On the E. side, a rocky ledge extends from near the N. extreme of the town to the southeastward for more than 200 yards, which affords shelter to small craft from northerly winds, in about six feet water; the rocky ledge is connected to the shore by a jetty on piles. The small town, containing about 8,000 inhabitants, stands close to the sea-side on a low shore; it has but little trade.

In fine weather vessels anchor in  $5\frac{1}{2}$  fathoms, hard mud, about half a mile from the town, which may be recognized by two white conspicuous steeples.

**PORT BARI.**—The coast between Mola and Bari, 11 miles to the NW., is bordered by rocks, and presents no remarkable features, excepting Pelosa and Carnosa towers; St. Giorgio inlet is between the two towers, and at half a mile to the NW. of its entrance, is the Punta d'Oro, a shoal with  $1\frac{1}{2}$  fathoms water on it. There is anchorage for small vessels off the inlet.

The old port of Bari, on the SE. side of the town, is small and shallow; it is protected northward by the town wall and mole adjoining, and another mole extending northeastward from the beach on the S., shelters it from the SE. quarter. The entrance between the moles is

open to the eastward, and nearly 200 yards wide; within, the depth is from six to nine feet; the space is sufficient for several small vessels, which moor under the N. mole with their heads to the eastward, and an anchor laid out in this direction against the heavy sea which occasionally sets in.

The old port is difficult of access in strong northerly and in easterly winds; in the former, the sea washes over the piers. Care must be taken to avoid a rocky shoal awash, on which the sea breaks in heavy weather; its outer edge is more than 400 yards northeastward from the end of the northern pier, and is marked by two white buoys, in  $3\frac{1}{2}$  fathoms water. This shoal rises from the shallow rocky bank, which surrounds the E. side of the town.

The town, ancient *Barium*, is close to the sea upon a low projecting point; it is fortified and well built, the capital of the province of Bari, contains about 20,000 inhabitants, and is the chief commercial town on the coast, exporting considerable quantities of corn, wine, oil, almonds, and potash. The environs are fertile. Many ancient tombs and some fine vases have been discovered. At Bari is a semaphore with an electric telegraph.

**New Port.**—The new port of Bari is formed by a mole or breakwater extending in the direction N.  $45^{\circ}$  W. for about 200 yards then N.  $77^{\circ}$  W. 440 yards. A beacon-buoy, surmounted by a ball painted in red and white stripes, marks the extreme limit of the submerged part of the breakwater. The soundings from 30 feet at the mole head, decrease within to 25 and 20 feet and gradually to the shore. The breakwater completely protects the port from strong NE. winds, but it is imperfectly sheltered from NW. winds.

Within the new port the quay has been extended about 200 yards in the direction S.  $40^{\circ}$  W. At the end of this prolongation there is a projecting pier for landing which extends about 220 yards in the direction N.  $59^{\circ}$  W., is about 100 feet wide, and has about three fathoms of water at its outer extremity. A causeway, starting from a point about 110 yards W. of the castle, has been constructed to communicate with the new quay.

The mooring-buoy lies about 330 yards from the extremity of the landing pier, upon its direction prolonged.

**Anchorage.**—Vessels of large draught anchor in 17 fathoms, sand, about a mile off Bari, either with the two conspicuous steeples of the town in line, or with the castle between them. This spot is sheltered from southerly and from westerly winds, but greatly exposed to those from N. and from E. Nearer the town, especially between the depths of 10 and five fathoms, the bottom is foul. There is also anchorage

about two-thirds of a mile to the NW. of San Cataldo light tower, and the same distance from the shore, in 10 fathoms.

The town of Bari is readily distinguished from the eastward by the two steeples above mentioned, the higher of which is square, of a brown color, and surmounted by another small steeple. The castle, with its two black towers, will afterwards be seen, and then the high walls of the town.

**LIGHTS.**—On San Cataldo point NW. of Bari, is an octagonal white tower 204 feet high, from which is exhibited at 218 feet above the sea, a *fixed* white light varied by a *flash* every *three minutes*, and visible in clear weather from a distance of 21 miles.

A *fixed red* light is exhibited from the extremity of the mole at the new port of Bari.

The light is elevated 33 feet above the level of the sea, and is shown from a tower on an unplastered wall, 164 feet from the submerged scarp of the fortifications.

It is visible at a distance of five miles all around the horizon.

Also, a *fixed green* light is shown from the N. mole of the old port, visible three miles.

**Giovinazzo.**—Between Bari and Molfetta,  $9\frac{1}{2}$  miles beyond, the only conspicuous objects are the light-house on the rocky point of San Cataldo, under the west side of which vessels may anchor; the tower of the small port San Spirito; and Giovinazzo, a small dilapidated town on a steep cliff, to the westward of which is a creek frequented by coasting vessels. The church has two brownish steeples of unequal height. In fine weather, a vessel may anchor at a moderate distance off Giovinazzo, a little westward of the town. Number of inhabitants, 8,900; manufactures, cotton and hemp cloth.

**MOLFETTA.**—The port, which is on the W. side of the town and formed by a detached curved breakwater which protects it from NE. winds, is sheltered from northerly and from westerly winds by a rocky ledge above water, which lies parallel with, and about 200 yards from the shore; and by a second detached breakwater between the rocky ledge and the curved breakwater, but outside or N. of them. The depth inside varies from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms.

There are thus two entrances to the port: one between the curved breakwater and E. end of the outer breakwater, at the W. end of which is the light-house; and the other between the light-house and the rocky ledge to the SW. of it. The first named entrance should be preferred; the deepest water is in mid-channel of both entrances. The town, which is of some commercial importance and contains 14,000 inhabitants, stands on the sea-shore, and presents an imposing appearance.



Works have been undertaken for the improvement of the harbor of Molfetta, which are expected to last five years.

The old mole projecting to the westward from the shore is to be connected with the E. end of the curved breakwater by an arm extending N., and with the shore S. of it by a broad quay prolonging this new arm to the southward.

The outer or N. breakwater will be extended by an arm projecting 142 yards N. 13° W. from its western extremity, and continued 155 yards further in the direction N. 68° W.

A buoy has been placed to mark the extremity of the works prolonging this outer mole. It is in the form of a parallelopipedon, surmounted by an iron framework supporting a *red* globe.

Vessels must pass to the northward of this buoy.

**LIGHT.**—A *fixed* light varied by a *flash* every *three minutes* is shown from a light-house on the W. extreme of the outer detached breakwater of Molfetta, at an elevation of 65 feet above the sea, and visible in clear weather at a distance of 14 miles.

**BISCEGLIE.**—This little port, 4½ miles from Molfetta, extends southward a little more than 200 yards; it is sheltered from E. and from W. winds, with a depth of two fathoms at the entrance, and of six to 10 feet in the middle. It is formed by an indentation of the shore on the W., and by a mole on the E., and the entrance is about 120 yards wide. The small craft which frequent the port moor to the quays or alongside of the mole, or to a bollard on the rock near the center of the port, to the southward of which there is scarcely a depth of three feet.

The town of Bisceglie, which is close to the shore, contains 21,200 inhabitants, trades in oil and fruits, and has one or two small establishments for building and repairing coasting vessels. It is entirely destitute of springs, and rainwater only can be obtained.

**TRANI** is a handsome town surrounded by lofty walls, protected by a strong castle, and has a population of 14,000 inhabitants. It may be recognized by a church on an eminence near the center; also by the castle with three bastions at its western extremity.

The port is 4½ miles westward of Bisceglie, and, though once important, is almost filled with sand, so that scarcely 10 feet water can be found at its entrance, and five feet in the middle. The shape is circular; the entrance, less than 100 yards wide and open to the northward, and is formed between two piers. It is only capable of admitting vessels of very light draught, which moor under shelter of the eastern pier.

In fine weather, and with an off-shore wind, vessels anchor off the coast, at about a mile from the port, in seven and nine fathoms, sandy bottom.

**BARILETTA** is  $6\frac{1}{2}$  miles westward of Trani; the coast between is low, sandy, and uninhabited; boats may haul up on it. It contains about 27,000 inhabitants. The town of Barletta was once splendid and populous, but now presents an indifferent aspect. The streets are, however, well paved, the houses large and lofty, the cathedral is remarkable for its antique granite columns, the citadel is spacious and commands the port. A considerable trade is carried on in salt, prepared near the town in salinas, which render the atmosphere very unwholesome.

The harbor is northeastward of the town, between a pier projecting nearly 400 yards in a N. by W.  $\frac{3}{4}$  W. direction from it, and a breakwater to the northward; the latter, 273 yards in length in an E. and W. direction, is horseshoe shaped, and affords shelter from northerly winds.

Vessels moor between the pier and the breakwater in from five to 10 feet, sand, with an anchor to the eastward, and make fast to the breakwater. They ride here securely with N. and northeasterly, but not so well, though without being exposed to any danger with easterly winds, which raise a heavy surf.

The eastern passage into the harbor is the best. A vessel should not run for this harbor with southerly winds and bad weather, as the sea then breaks on the pier and breakwater, and renders access dangerous.

At Barletta is a colossal statue of the Emperor Heraclius.

**Supplies.**—Provisions of all kinds are plentiful, but the water is bad. Vessels of war obtain the latter from the citadel; others from a cistern near the entrance. Coasting vessels are built, and every facility for small repairs will be found.

**LIGHT.**—A light-house stands on the eastern extremity of the breakwater at Barletta, and exhibits a *fixed* white light, 69 feet above the sea, and visible in clear weather at a distance of 9 miles.

**Barletta Road** is superior to that of Bari. Anchorage will be found in  $5\frac{1}{2}$  to  $6\frac{1}{2}$  fathoms, mud and gravel, NW. of Barletta, at three-quarters to  $1\frac{1}{2}$  miles from the light-house, or farther out in eight or nine fathoms, sandy bottom. Vessels which arrive laden with salt generally moor with open hawse to the NE., the castle in the eastern part of the town in line with the northern angle of the latter. This anchorage is chiefly frequented during the fine season, being very dangerous in winter with the wind on the land.

At night a vessel should anchor with the light-house bearing about SW.  $\frac{3}{4}$  S. distant between two and three miles, in a depth of seven to nine fathoms.

Barletta will be recognized by an elevated mountain 14 miles S. by E.  $\frac{3}{4}$  E. from the town, and on the summit of which is a castle; it is, moreover, the first town on the coast southeastward of Gargano head.

**Ofanto River.**—The land in the vicinity of Barletta is fertile, but beyond this commences a series of low and marshy beaches, which border the gulf of Manfredonia. At  $3\frac{1}{2}$  miles northwestward of Barletta is the mouth of the Ofanto, the most easterly river of Italy. It rises in the Apennines, near the town of St. Angelo de Lombardi, and empties at the boundary of Capitanata and Bari provinces, discharging a large amount of deposit. Fishing vessels ascend this river when the bar at its mouth is least obstructed.

At four miles northwestward of the mouth of the Ofanto are the Government salt-marshes of Barletta; they are easily recognized by large storehouses on the sea-shore, and off which, in fine weather, vessels anchor at two miles from the land, in eight and seven fathoms, mud bottom.

**Lake Salpi.**—From Barletta salt marshes to the town of Manfredonia, a distance of about 20 miles, the coast is low, sandy, and intersected by marshes, which render it unhealthy. The first is lake Salpi, also called Salapina marsh, a vast sheet of water extending from the salt marshes of Barletta, nearly  $6\frac{1}{2}$  miles to the northwestward, and only separated from the sea by a narrow strip of sand, about the center of which stands the Pietre tower. The mouth of the Carapella river is indicated by the tower of Rivolo,  $6\frac{1}{2}$  miles nearly beyond Pietre tower.

The other lakes, fed by the waters of small streams flowing from the Apennines, and intersected by strips of land on which a few buildings may be seen, are not so large as Salpi. The most important are the Salso marsh, which communicates with the sea by the same mouth as the Candelaro river; at a mile to the southward of Manfredonia is the St. Antonio canal, the mouth of the marshes of Sipontum; it is opposite the ruins of ancient *Sipontum*, which lie on a hill.

**MANFREDONIA.**—The town of Manfredonia, founded in 1250 by King Manfred, occupies a pleasant site at the head of the gulf of Manfredonia, and at the foot of mount St. Angelo; it is surrounded by walls and protected on the NE. side by a strong castle. Owing to its position it is the centre of the trade of the province of Capitanata and the adjoining country; it contains about 8,000 inhabitants, building yards, an hospital, and storehouses.

The small harbor is on the SW. side of a jetty which extends southward from an angle of the castle; the jetty is in bad condition and does not prevent the sand, washed up by easterly winds, from gradually filling up the harbor, the depth in which does not exceed five feet, except at the entrance, where there may be 10 to 12 feet. Strong southerly and southwesterly winds are dangerous and render access difficult.

**Supplies.**—Fresh provisions, vegetables, and fish may be obtained, and water from a fountain.

**LIGHTS.**—At 160 yards within the extremity of the mole is an octagonal tower, which exhibits at 65 feet above the sea a *fixed* white light, varied by a *flash* every *minute*, and visible in clear weather from a distance of 14 miles.

Also, a *fixed* white light is shown from the end of the mole, visible four miles.

On the approach of the mail steamer, a *red* light is shown from the southern part of the town wall.

**Manfredonia Road**, at the head of the gulf of Manfredonia, affords the best anchorage on the Italian coast, especially in a heavy bora gale; its position may be recognized by mount Gargano, the most elevated land on the whole of this part of the coast. Vessels ride safely at about two miles from the shore, in six to seven fathoms, mud bottom, with the town bearing NW.  $\frac{1}{4}$  N., and mount St. Angelo about N.  $\frac{1}{4}$  E.; or farther out, if necessary, in deeper water.

During summer, small vessels may anchor in five fathoms mud, a long half mile to the SE. of the mole head.

When lying at anchor at the head of the gulf of Manfredonia, the bora wind, called *Monterese* by the inhabitants, rushes down in violent squalls from the gorges of mount Gargano.

Manfredonia road is exposed to winds between SSE. and NNE; but however violent in the offing, the wind seldom blows strong near the land, and the sea is never very heavy at the anchorage. A southwesterly wind will sometimes blow at the anchorage in violent squalls, but not for any length of time; it blows lightly almost every night, veers to the westward at daybreak, and remains in that quarter during the greater part of the forenoon.

**DIRECTIONS.**—Mount Gargano is lofty and isolated, and a useful guide for the anchorage in Manfredonia road from whatever quarter it be approached. It is the first high land seen on the coast of Italy in coming from the Mediterranean; mount Calvo, its most elevated peak, is 3,461 feet above the level of the sea, and mount St. Angelo, 2,900 feet; near the summit of the latter is the town, a tower with a semaphore, and a church.

In running from the northwestward with a bora wind for the anchorage in Manfredonia road, the coast of Gargano head should be rounded at a short but prudent distance, taking care to be prepared for the violent gusts from the high land. If the wind be northwesterly outside, it will in summer generally be found about NE. by E.  $\frac{1}{4}$  E., after passing the head; in winter, on the contrary, it hauls to the westward and

comes down in violent squalls from the high land of Gargano. In such a case, a sailing vessel may have to tack, the land should be close aboard, except to the southward of Manfredonia, where the water shoals off some distance, and at nearly three miles to the NE. of the tower of Rivolo, there are only  $5\frac{1}{2}$  fathoms.

**Mattinata.**—The best anchorage for a vessel coming from the westward, and not wishing to stand far into the gulf, is eastward of Rossa point and distant from it two miles, in six or  $6\frac{1}{2}$  fathoms water, mud bottom. This anchorage is nine miles SW. of the eastern extremity of Gargano head, and in addition to the light-house on Rossa point, and the telegraph station on the hill, about 660 feet high above it, a tower on the shore three-quarters of a mile to the northward, and the town of Mattinata inland, will be seen in the midst of cultivated land.

There is also anchorage off any part of the coast between Mattinata and Manfredonia, in the same depth of water, at not a greater distance from the land. Should the force of the wind compel a vessel to bring-to farther off, the anchor should be dropped within three miles of the land, and to the southward of Mattinata, where about the same depth of water, mud bottom, and good holding ground, will be found; this anchorage has often been used by vessels of war.

Nearly midway between Manfredonia and Rossa light-house, and a long half mile from the shore, there is a shoal patch with 16 feet water on it, which should be avoided in large ships.

**LIGHT.**—On Rossa or Monte-grugno point near Mattinata, is an octagonal turret 15 feet high, which exhibits at 253 feet above the sea a *fixed* white light, varied by a *flash* every *three minutes*, and visible in clear weather from a distance of 17 miles.

**GARGANO HEAD.**—Between Manfredonia and Gargano head the coast is everywhere elevated and inaccessible. The eastern part of mount Gargano presents a face of about 11 miles in breadth. The coast is high, and perpendicular towards the sea, and may be approached to a prudent distance; the head is the most easterly projection, high, and steep towards the sea. To the southward of the head are the Campi and other towers, and N. of the former is the little islet of Campi; to the northward, between the head and Viesti, are the towers of Felice and Gattarella, and the islet of Porto nuovo surrounded by rocks.

To the eastward of Viesti is a low and open beach, where vessels may anchor temporarily in  $5\frac{1}{2}$  to  $6\frac{1}{2}$  fathoms, hard mud. This anchorage, which is sheltered from westerly winds, may be used by vessels seeking shelter from that quarter; but the anchor should be weighed immediately the wind begins to abate.

**PORT VIESTI,** nearly four miles to the northward of Gargano

head, is between two projecting points; Sta. Croce islet 165 yards off the N. point, protecting it in some measure from the NE. The port is small, has generally from eight to 12 feet water, but near the islet, which is surrounded by a bank, there are 20 and 23 feet. The depth, however, seaward increases both to the NW. and SE. of Viesti, and where an anchor may be dropped with off-shore winds in case of necessity. The port is open to the eastward, and the currents run with great strength. Coasting vessels, by which alone Viesti is visited, make fast to Sta. Croce islet.

The small town of Viesti stands on a rocky point close to the sea, and at the foot of the summit of mount Gargano. It is built in the shape of an amphitheatre, and may be recognized in its isolated position by a fort on which is a semaphore with an electric telegraph, by a steeple which overlooks the town, and on the N. by Sta. Croce light-tower. It has a population of about 7,000. The borgo or suburb stands on the shore between the two points of the bay. Small supplies may be obtained.

**LIGHT.**—On Sta. Croce islet is a tower rising from the keeper's dwelling, from which, at 131 feet above the sea, is exhibited a *fixed* white light, visible in clear weather from a distance of 18 miles.

**The Coast,** from port Viesti, trends round northwestward nine miles to the village of Peschici, and although there are sandy beaches, it is generally of difficult access even to fishing-boats. The most conspicuous objects are the Monticello, Porticello, and Spinale towers, and the projecting point and tower of Calalunga. The land may be approached to the distance of a mile, bearing in mind that the current sets towards it.

**Peschici,** at nine miles from Viesti, is a small village on a picturesque elevation perpendicular towards the sea. There is indifferent anchorage for coasters in  $2\frac{3}{4}$  to three fathoms, mud bottom, to the westward of the village.

**Rodi.**—At six miles to the westward of Peschici is the town of Rodi, on an advanced and precipitous hillock; it occupies a beautiful position amidst gardens and olive trees. A pier formerly protected the small harbor of Rodi against northerly winds; but was destroyed by the sea. Coasting vessels generally anchor a quarter of a mile from the shore, but the anchorage is not good. The town will be recognized by Ischitella church steeple on an eminence above it. Population about 5,000.

**Supplies.**—Provisions and water may be obtained. A great trade is carried on in oranges, lemons, and almonds; timber for ship-building is brought from the forests of Gargano.

**ANCHORAGE.**—Vessels of large draught may anchor between Peschici and Rodi, at  $1\frac{1}{2}$  miles or more from the coast, in about 10 fathoms water, sheltered from a southeasterly gale, and from all off-shore winds. This anchorage may be useful to a vessel bound out of the Adriatic, which, overtaken by a strong SE. wind, is unable to round Gargano head; but it should be abandoned at the slightest symptoms of a sea breeze.

**TREMITI ISLANDS**, formerly so called from frequency of earthquakes, and lying 20 miles NW. of Rodi, are four in number, almost uncultivated, and produce nothing but a little oil and firewood. They are low and scarcely visible in fine weather, at a distance of 10 or 12 miles. The only water is in the well of a fortress on the SW. end of San Nicola island. Their shores, and especially the northern, are generally steep and inaccessible; the soundings around them are deep, varying from 17 to 35 fathoms.

San Domino, the largest and SW. island of the group, is  $1\frac{1}{2}$  miles in length, and nearly three-quarters of a mile in breadth. It is a little more elevated than the others, a hill rising at its southwestern part.

Cretaccio, the smallest of the group, is about 400 yards in length, and 150 yards from the NE. end of San Domino, and having at its E. end a large rock awash, named La Vecchia. There is no passage between San Domino and Cretaccio, nor between the latter and La Vecchia.

San Nicola, the southeastern island, is steep, rocky, and about a mile in length; at its SW. end is a large building formerly a convent, a fortress, a small pier for boats, and the landing place. The passage between San Nicola and La Vecchia is fit only for vessels of light draught, as only about 15 feet water can be carried through. Here there is a semaphore station.

Caprara, the NE. island of the group, is steep on its N. side, gradually slopes to the southward, and is separated from San Nicola by a passage about 300 yards wide; vessels using this passage should keep in mid-channel.

**ANCHORAGE.**—The anchorage at the Tremiti islands is sufficiently sheltered from a bora gale, and is also convenient for vessels unable to round Gargano head in order to reach Manfredonia road. A vessel of large draught should anchor off the SE. coast of San Domino, at about a third of a mile from the shore, in 17 to 35 fathoms, mud bottom, good holding ground. The nearer a vessel approaches the SW. end of San Nicola, the better she will be sheltered from the bora. Small vessels may anchor sufficiently near San Nicola to be able to make fast to some strong posts under the fort, or between San Nicola castle and San Dom-

ino, securing to posts on Cretaccio; they also anchor between Cretaccio and San Domino, and run a hawser out to each island. The latter anchorage is preferred because it affords greater security against the bora.

Coasters sometimes seek shelter from SE. gales in Cala de' Turchi, a small creek on the W. side of Caprara island.

**LIGHTS.**—On the E. end of Caprara island is a white octagonal tower, which exhibits at 118 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 10 miles. The light is seen through an arc of about 258 degrees, or when bearing from ESE.  $\frac{1}{2}$  E. round by S. and W. to N.  $\frac{1}{2}$  E. Also through an arc of  $3\frac{1}{2}$  degrees in the direction of the channel and anchorage formed by the islands of San Nicola, Cretaccio, and San Domino.

Also a *fixed* white light is shown from San Nicola castle, visible six miles.

**DIRECTIONS.**—As there is no good harbor between Ancona and Manfredonia, and vessels are often forced to leeward by bora gales, which at times blow four or five days more or less and with great violence, the anchorage at the Tremiti islands is in such cases recommended. The anchorage affords shelter with the wind from about NE. to W. by S.; with the wind from the northward a vessel should pass to the eastward of the islands, and along the S. side of San Nicola as close as convenient, there being more than 30 fathoms water, close-to, for the anchorage at its SW. end.

The anchorage to the N. of San Nicola is more exposed and not so convenient for getting under way, and vessels will have to avoid a rocky bank lying between the SW. point of Caprara island and Cretaccio, at nearly 450 yards NE. of the latter, and on which there is only a depth of one fathom.

**PIANOSA ISLE**, lying about ENE.  $\frac{1}{2}$  E.  $11\frac{1}{2}$  miles from the NE. extreme of Tremiti islands, is a low, flat, arid rock, depressed towards the S. point, but rising a little on the N. It is nearly 800 yards in length, and about 300 yards in breadth; the N. side is steep to at the distance of 100 yards; the S. side is foul more than 400 yards off. This islet is only 50 feet above the level of the sea, the currents in its locality are rapid and uncertain in direction, and it should therefore be avoided in any weather.

**PELAGOSA ISLES**, two in number, Grande and Piccola, lie nearly in the middle of the Adriatic, about 25 miles ENE. from Pianosa islet. Like the latter, Pelagosa Grande is an uncultivated rock, rising perpendicularly towards the S., and less steep on the N. point; it is nearly two-thirds of a mile long in an E. and W. direction, and not more than 200 yards broad, with its highest part to the NW. Rocks, level with



the water, extend upwards of 200 yards from its western point. At the NW. end of the islet is a small cove, where fishermen haul up their boats in bad weather. Pelagosa Piccola, 127 feet high, and about 300 yards in length, lies off the eastern end of the larger islet, and is surrounded by rocks to the distance of more than 200 yards.

Pelagosa Grande is 343 feet above the level of the sea; its position, in the middle of the Adriatic, and about midway between Gargano head and Lagosta island, renders it a good point of departure to vessels navigating the Adriatic during the fine season. They should, however, always avoid approaching it closely, especially at night or in thick weather, on account of the currents, which are very irregular in its vicinity.

**LIGHT.**—On the highest part of Pelagosa Grande is a light-house, which exhibits at 354 feet above the sea, a *fixed* white light varied by a *flash* every *half minute*, and visible from a distance of 26 miles.

**CAJOLA ROCK.**—This danger lies ESE.  $\frac{1}{2}$  E. about three miles from Pelagosa Piccola; it is awash, and barely 200 yards in length. About a quarter of a mile to the eastward of the Cajola is Pampano, a narrow rocky ledge, about two-thirds of a mile in length, and in the center of which are breakers. It would be imprudent, on account of the currents, to pass between Pelagosa and Cajola, although the channel is wide and deep.

**COAST.**—Beyond Rodi commences a long uniform sandy beach, which extends almost uninterruptedly for about 150 miles, as far as mount Conero. From Rodi to the mouth of Tronto river, although the coast is not very populous and only cultivated in the vicinity of towns, provisions may be obtained in abundance, and fresh water is everywhere supplied by numerous torrents descending from the Apennines; but there is not a single harbor where a vessel may obtain shelter. The water shoals for about a third of a mile from the shore, over a bottom of sand or gravel; farther off the bottom is mud, or mud and sand.

The whole of this portion of the Italian coast may, in fine weather, be ranged along at the distance of a long mile, in depths of six to 10 fathoms, but the lead should be kept going. Vessels may, with off-shore winds, anchor at two miles in the offing, in good holding-ground, or in fine weather, even with southeasterly winds. The following is a brief description of the principal anchoring places of coasters.

**Mileto Point.**—At 10 miles from Rodi is Capojale point, the termination of a long sandy shore called Varano wood; to the westward of which is Mileto point and tower. The coast between these two points and for a mile westward is rocky, of some height, and precipitous. Mileto point is remarkable for its projection to the northward between

two long sandy beaches, and as terminating a chain of heights separating the two great lakes of Varano on the E. and Lesina on the W. The tower of Mileto is a semaphore and electric telegraph station.

**Varano and Lesina Lakes.**—These lakes, which are only separated from the sea by a low, narrow strip of sand, overgrown by a forest of beech and oak trees, communicate with each other by two small channels inaccessible even to fishing boats. The only trade carried on in the neighboring villages and in the town of Lesina, near the southwestern extremity of the lake of this name, is in fish, with which the lakes abound.

**Fortore River**, the ancient *Frento* or *Frentone*, rises in the woods of Mazzocco, at mount Chilone, and its mouth, which is about 14 miles to the westward of Mileto point, and  $4\frac{1}{2}$  miles beyond Pietre Nere point, may be recognized by a large tower-shaped storehouse. Small craft drawing about four feet can ascend the river, when the position of the shallow banks which form at its mouth leaves the pass free.

**ANCHORAGE.**—Vessels anchor at  $1\frac{1}{2}$  miles from the shore, N. of the mouth of Fortore, in about 11 fathoms, sandy bottom, the storehouse at the mouth of the river bearing S.  $\frac{1}{4}$  W. This, however, is a bad anchorage, with NE. and northerly winds, as they raise a heavy sea, and accelerate the currents; but it affords tolerable anchorage with easterly and southeasterly winds, an advantage not possessed by any of the anchorages to the westward as far as Ancona. The position will be recognized by the large tower-shaped storehouse on the beach, in which the produce of the interior, particularly the corn destined for exportation, is deposited. Coasters obliged to remain any length of time at this anchorage moor their vessels securely, the crews going on shore at sunset to avoid being wrecked in them, in the event of a heavy bora.

**Campomarino.**—From the mouth of the Fortore the coast is low and almost entirely covered with the woods of Sta. Agata, Maresca, and Ramitello; the shore all along is a sandy beach, the only remarkable objects being the towers of Mazza and Saccione (the latter near the mouth of a river of the same name), and then the tower and village of Campomarino, standing on an elevation near the shore, and surrounded by a fertile plain. Campomarino is near the right bank at the mouth of the river Biferno, which has its source at the foot of the mountains of that name near Boiano, and empties into the sea through marshes and sandy land; fishing boats are able to ascend it when the waters are swollen.

**Anchorage.**—Vessels may anchor off Mozza tower in nine or 10 fathoms, northeastward of a mountain inland, which will be seen between mounts Lesina and Termoli. There is also an anchorage off Campo-

marino, in eight to six fathoms, at a fair distance from the shore, the same precautions being required as at Fortore. At about  $4\frac{1}{2}$  miles to the NE. of Termoli the town of S. Martino in Pensilis will be seen over Campomarino.

**TERMOLI.**—This town stands on a projecting rocky point, at  $3\frac{1}{2}$  miles to the NW. of Campomarino; it is small, fortified, and contains about 3,000 inhabitants. Small supplies and water may be obtained.

**Anchorage.**—Vessels anchor off Termoli at about  $1\frac{1}{2}$  or two miles northward or northeastward of the town, in nine to 12 fathoms, mud bottom, with the town in line with a mountain inland. This anchorage is, however, very inconvenient with easterly, southeasterly, and northerly winds, and vessels should stand off the land if the wind comes from either of these quarters.

**Coast.**—The coast from Termoli bends round to NW. and N. for 18 miles to Penna point, and is a wooded desert, with the exception of the town of Vasto, at the turn of the bend; but being low, and bordered by a sandy beach as far as Vasto, coasting boats are enabled to approach it and haul on-shore in case of need. The interior of the country is high and mountainous. Numerous rivers and torrents discharge their water into the sea between Termoli and Vasto, and some rocks lie here and there near the shore between Vasto and Penna point. The Trigno, the position of which is shown by Montebello tower, is the only important river, being navigable for small craft when the banks at its mouth will admit of their crossing the bar.

**Anchorage.**—The anchorage of Petacciata is eight miles to the SE. of Vasto, in six and seven fathoms, good holding ground. This is a fair anchorage with the wind on-shore, the sea being broken before it reaches it; when running for it, a vessel should steer for the land midway between Termoli and Penna point, toward a large wood, anchoring at a prudent distance from the shore.

**Vasto.**—This town is on elevated land at the bend of the coast between Termoli and Penna point; it is fortified, and has a population of about 10,000 persons; the neighborhood is well cultivated. Water and provisions are in abundance.

There are a number of convents, hospitals, and asylums in the place.

The principal manufactures are silk, woolen cloth, and coarse earthenware. The fisheries are very active.

**Anchorage.**—Vessels anchor in nine fathoms, mud bottom, good holding ground, at about three miles northeastward of the town; they generally moor with open hawse to eastward, and by backing their anchors are able to hold on with a strong breeze from E. or ENE., if unable to get under way. Small coasters anchor near the town, at about a mile from the shore.

**Penna Point.**—The coast between Vasto and Penna point is rocky, high, and inaccessible, on account of the rocks by which it is bordered. The point itself is composed of dark rocks, and is easily known by its projection to the NE. ; also by a church, and a semaphore tower on its most elevated part, and by a large building on a little inland.

**Sangro River.**—From Penna point to the mouth of Sangro river the shore is sandy, and with the exception of Aderico rocks, near the tower at a mile to the westward of the point, is everywhere accessible. Amongst the numerous torrents which reach the sea on this portion of the coast, the Sangro is the only one of any importance. It takes its rise in the mountains near lake Celano, and falls into the sea at Turino wood, eight miles westward of Penna point; a tower on the right bank marks its mouth. It is navigable for small craft when the entrance is open.

To the westward of the Sangro, as far as the tower at the mouth of Feldrino river, and the small village of St. Vito, the coast is everywhere bordered by rocks; but between the latter and Ortona, where two rivers which rise at the foot of mount Maiella reach the sea, it becomes low and accessible. St. Vito village stands almost at the margin of the sea, between two well-cultivated hillocks.

**ORTONA.**—The town of Ortona is about 17 miles northwestward of Penna point, and its position may be easily recognized from the sea by the Mejella mountain, the summit of which, 7,496 feet above the sea, is an enormous round mass 18 miles southwestward of the town; the church steeple of Chieti, and the various buildings of Ortona will be seen on nearing the coast. The town is surrounded by walls, and contains many large buildings; its population, chiefly fishermen, is about 7,000. The environs are well cultivated. Provisions and cistern water are easily obtained.

The point on which the town stands runs out northeastward about 200 yards, and is surrounded by rocks; the small harbor of Ortona is formed by a pier about 110 yards in length extending from the point, which shelters the anchorage from northerly winds. The depth of water is only about 12 feet, sandy bottom, and it is therefore only available to small craft. A new mole is in course of construction. There is indifferent anchorage at a mile from the land, eastward of the town.

**LIGHT.**—At 27 yards within the extremity of the new mole at Ortona, is exhibited, at 39 feet above the sea, a *fixed* white light, visible at a distance of six miles.

**Francavilla.**—At about seven miles northwestward of Ortona is Francavilla, a somewhat remarkable village, containing about 2,600 inhabitants; it is near the margin of the sea, on a small eminence sur-

rounded by well-cultivated lands. The shore between the towns is low and sandy, the only remarkable objects being the tower of Mucchia, and those at the mouths of Ariello and Foro rivers.

**Pescara River**, which separates the two Abruzzi, has its source in the mountains which surround the town of Aquila, winds round the Gran Sasso d'Italia, passes Chieti, and falls into the sea, after flowing through the town of Pescara. The Pescara river divides the town into two parts, and is much frequented by coasters, which carry on the trade of the Abruzzi provinces, and forms the safest little harbor on the coast. It has a depth of  $6\frac{1}{2}$  feet, and can accommodate about 30 small vessels, which make fast to posts on the banks.

The town is four miles from Francavilla, and stands on a plain, is fortified, and contains a population of about 2,000 persons. Boats are built for the coasting trade. Small supplies can be obtained, but the water is bad.

**Anchorage**.—There is an anchorage at  $1\frac{1}{2}$  miles from the mouth of Pescara river, in eight to 11 fathoms, mud bottom, and good holding ground, with the tower at the mouth of the river bearing SW. by W.  $\frac{1}{4}$  W.

**MOUNT CORNO**.—The position of Pescara and the whole of this part of the coast is easily known by mount Corno, called also the Gran Sasso d'Italia, which is 25 miles westward of Pescara; it is the highest elevation in the neighborhood, being 9,508 feet above the sea, and may be recognized by its summit, which is divided into two pyramidal peaks of similar shape.

When bound to Pescara, vessels should steer midway between mounts Majella and Corno, until the fortress of Pescara is seen, which is low, and visible only at a short distance.

**COAST**.—From Pescara river—to the westward of which is a large pine forest—to the Tronto river, 30 miles to the northward, the coast is low and sandy, and thinly inhabited, owing to the unhealthfulness of its marshes. The remarkable objects are the village and castle of Silvi, on an eminence eight miles from Pescara; Cerrano tower; the steeple of Atri church, 1,630 feet above the sea, about  $4\frac{1}{2}$  miles inland; the town of Mutignano, two miles from the coast, and 1,070 feet high; Montepagano; the village of Giulianova, on an eminence one mile from the mouth of Tordino river; and the town of Tortoreto on an elevated hillock between Giulianova and the Tronto.

This coast is intersected by seven rivers: the Salino Maggiore, the Piomba, the Calvano, the Vomano, the Tordino, the Salinello, and the Vibrata. These are of little importance, and with the exception of the Salino Maggiore and the Vomano, which fishermen occasionally ascend,

they all become dry in summer; each of them gives rise to an accumulation of silt at its mouth.

**Anchorage.**—In fine weather, vessels anchor at  $1\frac{1}{2}$  miles from any part of this coast in six or seven fathoms, mud bottom, and may safely range along it at that distance unless the wind blows right on to the shore.

Boats engaged in the export trade of the coast, anchor off the shore abreast Silvi and Giulianova villages, hauling on shore in case of need, except at Cerrano tower, in front of which it is said to be rocky.

**TRONTO RIVER** rises at the foot of the Sibilla mountains, flows past Ascoli, and falls into the sea between two towers. There is scarcely a depth of three feet at its mouth at high water, at which period coasters ascend it for about half a mile, passing with difficulty between the banks by which it is obstructed. The town of Colonella stands on an elevation 1,096 feet high, three miles southwestward from the mouth of the Tronto, and is a good mark for its position.

## CHAPTER V.

### TRONTO RIVER TO PO DI GORO.

#### VARIATION IN 1883.

Tronto river, 10° 29' W.

Po di Goro, 11° 04' W.

**COAST.**—From the river Tronto to the mouth of the Po di Goro is a distance of about 150 miles. Between the Tronto and Ancona the coast is generally low and sandy; hillocks occur at long intervals, in continuation of the Apennines, but do not reach within half a mile of the shore excepting between Marano and S. Giorgio, the port of Fermo, where the shore is steep. These elevations form a pleasing contrast with the beach, being well cultivated and covered with towns and villages.

At Rimini the coast suddenly becomes uniformly low and sandy, and continues so to Maestra point; between Rimini and Cervia, towns and villages are visible in the midst of a large cultivated plain; but beyond the latter town the coast is intersected by marshes, and inland is the largest pine forest of Italy, extending from Ravenna to Primaro.

The rivers and numerous streams which run into the sea, to the north-westward of Ancona bring down a great quantity of soil, causing an extension seaward. The banks thus formed vary so often in shape, and extend so far off, that it would be prudent for vessels not to approach the shore in bad weather. Where the land is high, rocks here and there border the shore, and render it of difficult access, even to boats.

**ANCHORAGES.**—Small vessels may anchor off any part of the coast between the river Tronto and Cesenatico, at a distance of half a mile, especially in front of the towns and villages; and between Cesenatico and Maestra point at 1½ miles; but all these anchorages, though good with off-shore winds, are dangerous with others, and care should be taken not to be surprised by them. Vessels of large draught, in case of need, may anchor about three miles off the coast, where good holding ground of hard mud will be found. Between the river Tronto and mount Conero, the anchorages are only good with off-shore winds, or in fine weather. It should be particularly borne in mind that, on coming to an anchor by night or in foggy weather along this portion of

the coast of Italy, the lead should be kept going, care being taken not to stand in to a less depth than nine to 12 fathoms.

From Sirolo and as far as Ancona, the coast is high and perpendicular, with deep water close to, and vessels should not anchor off it except in cases of absolute necessity. Between Ancona and Rimini, the high lands of the Apennines decline to within about half a mile of the coast, and in some places, as at Ancona and Pesaro, meet the sea.

Off the coast between Ancona and Maestra point, in addition to the precaution of not approaching the shore too near, it will be necessary to ascertain by the lead the quality of the bottom should a vessel bring-to for anchors frequently drag, particularly between Rimini and Maestra point, on account of the great hardness of the clay.

**From TRONTO RIVER to MAESTRA POINT,** Ancona harbor is the only place which deserves the name, and which is capable of admitting vessels of large tonnage. All the rest, formed chiefly by mouths of rivers, are scarcely available to coasters, and are, moreover, of difficult access. The following is a brief description of them :

**St. Benedetto** is a village partly situated on a hillock near the sea,  $3\frac{1}{2}$  miles northward from the mouth of the Tronto.

**Grottamare.**—At three miles farther to the northward is the village of Grottamare, on the slope of a small hill, at the foot of which stands another village; the latter may be recognized at some distance by the tall belfry of a convent. The mouth of the Tesino, a small river of no importance, lies between Grottamare and St. Benedetto.

**Marano.**—At nearly two miles to the northward of Grottamare is Marano, another village on the summit of a small elevation not far from the sea.

These three villages, off which coasters anchor, are populous, and carry on a considerable inland trade. The coast between Tronto river and Marano is bordered by a bank at the distance of about half a mile, and in some places by breakers, which will not allow even boats to approach, except in fine weather. A vessel's position may be known when standing in by mount Vettore, 8,123 feet high, about 27 miles westward from Grottamare. This mount forms a part of the Apennine chain, and is easily distinguished by its arid summit, and by several whitish peaks at a short distance from each other.

**Pedaso**—This small village, about  $4\frac{1}{2}$  miles to the northward of Marano and on the right bank of the mouth of Aso river, is another place of some commercial importance. The river, off which coasters anchor, rises at the foot of the Sibillini mountains, it is capable of receiving small vessels in fine weather, and when the sand banks formed at its mouth permit.



**Port of Fermo.**—The town of Fermo, which may be recognized by a remarkable dome, is on an eminence 1,197 feet high,  $6\frac{1}{2}$  miles from Pedaso, and nearly four miles from the sea. Population 7,000. Vessels anchor off the coast before the village of S. Giorgio, eastward of the town; the beach on which the village stands is lower than any other part; like the rest, it is only approached in very fine weather, on account of the banks bordering it, the curve of the five-fathom line of soundings being about a mile from the shore.

The Lete, a small river of no importance, discharges one mile southward of S. Giorgio, between it and the small village of Palma, which is on elevated land to the southward. At  $3\frac{1}{4}$  miles N. of S. Giorgio is the Tenna, a small river accessible to boats occasionally in winter. This river, taking its source in the Sibillini mountains, is very rapid in spring and autumn, when the mud brought down by it is carried out to a considerable distance.

**Elpidio.**—The village of the port of S. Elpidio is  $1\frac{1}{4}$  miles to the northward of the mouth of the Tenna. S. Elpidio with its castle stands on a high hillock 930 feet high,  $3\frac{1}{4}$  miles westward of the village, which is a good mark in making the land. Coasters anchor off some large storehouses on the beach.

**Chienti River.**—This small river takes its rise in the Apennines, flows past Tolentino and Macerata, and after a course of 58 miles issues between S. Elpidio and Civitanuova. Fishing boats enter its mouth at high water.

**Civitanuova.**—The port of Civitanuova is three miles northward of that of S. Elpidio, and  $2\frac{1}{2}$  miles eastward of the town, which stands on a hill 590 feet high, and occupies the site of the ancient *Novana*. The anchorage off the village at the port is much frequented on account of the central position of Civitanuova, in the midst of a rich, populous, and well cultivated country. Coasting vessels are built here, and provisions and water are to be obtained.

**Montesanto.**—A  $3\frac{1}{2}$  miles to the northward of the port of Civitanuova is Potenza Picena, the port of Montesanto, the town of which stands on a hill  $3\frac{1}{2}$  miles from the beach. Vessels anchor off a small village close to the shore southward of the tower. At three-quarters of a mile S. of the tower is another tower at the mouth of the Asola, a small river rendered impracticable by mud banks at its entrance.

**Recanati.**—On the beach,  $4\frac{1}{2}$  miles northward of Potenza Picena, is the village of port Recanati. Coasters anchor off some large storehouses at the village, where they can haul on shore if necessary. The large town of Recanati stands on elevated land 1,056 feet high,  $5\frac{1}{2}$  miles inland. The dome and tower of Loretto, on a hill 600 feet high,  $2\frac{1}{2}$  miles NE. of the village, is a good mark for this anchorage.

Two unimportant rivers, the Potenza and Musone, issue near the village of the port; the former about half a mile to the southward, and the latter at  $2\frac{1}{2}$  miles to the northward.

**Umana and Sirolo.**—At five miles beyond Potenza Picena, and in the bight formed by the coast trending to the northward, are the Umana and Sirolo villages, on the eastern slope of mount Conero. Sirolo is on a hill by the sea; vessels may, in case of need, anchor off it, in  $6\frac{1}{2}$  fathoms mud, and will be sheltered from gales between N. and SW., by the base of the mountain.

**MOUNT CONERO.**—The coast changes suddenly in aspect at Sirolo, where it rises and forms the great elevation known as mount Conero, the most striking headland for many miles on this part of the coast. Mount Conero rises almost perpendicularly from Mezzaluna point, and between this point and Ancona light-house presents a front of about seven miles NW. and SE. On its SE. extremity, which is the most elevated, being 2,165 feet high, stands an isolated telegraph tower, which serves to mark the mount at a great distance, from whatever quarter it be approached; a convent stands half a mile southeastward of the tower. The mountain becomes gradually depressed on the NW. where it terminates in a truncated conical hillock, on which are numerous edifices and a church.

**Anchorage.**—A sailing vessel overtaken by a southwesterly gale, and finding it impossible to carry canvas, may seek temporary shelter on the NE. side of mount Conero at about a quarter of a mile from the land, where there is good holding ground; the vessel should, however, weigh when the wind, which does not generally last long, commences to abate.

**PORTO NUOVO** lies  $2\frac{1}{2}$  miles northwestward from Mezzaluna point. This little harbor affords a safe shelter to fishing and other boats when prevented by the violence of the wind from reaching Ancona. It is protected from northerly winds by a ledge of rocks, named Il Trave, which extends about a mile in a SE. direction from the shore; some of these rocks are awash, and mooring posts show their position. The entrance is between the eastern extremity of the ledge and Battery point, which is skirted by rocks and shallow water. The general depths in the harbor are four and five fathoms, gravel bottom.

The harbor is open to the southeastward, and as it is mostly frequented with winds from the westward, caution is necessary in approaching the land under sail, as from this quarter the wind rushes down with such force as to produce dangerous squalls.

**St. Clemente Rocks.**—Between Porto Nuovo and the western extremity of the base of mount Conero are some rocks awash, which

should be carefully avoided by a vessel working along the coast, when standing close into the land under mounts della Croce and Padrone; and a ledge, called St. Clemente rocks, lies off Ancona point, at the foot of mount Guasco, on which stands the cathedral of St. Ciriaco. There is no passage between these rocks and the point, and it will be prudent at all times to give them a wide berth as the current is strong in their neighborhood. The outer rock lies NE.  $\frac{1}{2}$  E., nearly half a mile from Ancona mole light-house, and more than 400 yards northward of the point; they are surrounded on the SE. and NW. sides by rocky shoals awash; on the northwestern rock, called Volpe, is a beacon 20 feet high.

**ANCONA.**—This town is built on a slope of the land, remarkable for the whitish appearance of its soil, between two hills; on one of which, the southernmost, in the form of an amphitheatre, named mount Astagno, stands the citadel, which commands the town and harbor; and on the other, mount Guasco, is the cathedral of St. Ciriaco. The town is ancient and well fortified, contains about 46,000 inhabitants, and has almost the whole of the commerce of this part of the Adriatic. In 1875, the value of the imports amounted to 1,060,882*l.*; and that of the exports to 685,097*l.* The principal imports consist of hardware, linen, metals, and coal; and the principal exports sugar, hides, and petroleum. At the light-house on monte Cappucini, is a semaphore and electric telegraph station.

On the inner part of the mole is one of the finest remains of antiquity, the triumphal arch erected by Trajan, A. D. 112. Provisions are in abundance, and water may be had at the lazaretto or at the town fountains.

**The Harbor,** about six miles northwestward of mount Conero, is the only good one in this part of the Adriatic, which is sufficiently capacious to receive vessels of large tonnage. It is formed by a mole and a breakwater, with an entrance between the two nearly a quarter of a mile wide. The N. or old mole projects 600 yards to the westward from the northern point of the harbor; it is 33 yards wide, 68 feet high, with a battery at its end, and is called molo Trajano; it is then prolonged by a modern mole 300 yards farther in a WNW.  $\frac{1}{2}$  W. direction. The breakwater on the S. projects to the NW. by N. at an angle to the mole, and terminates in that direction about 850 yards from the custom-house, sheltering the harbor from westerly and southwesterly winds.

The depth of water between the mole head on the N. and the end of the breakwater on the S., is from five to six fathoms, decreasing slowly towards the interior; the depths in the center of the harbor being four

and  $3\frac{1}{2}$  fathoms, thence shoaling very gradually eastward to the walls and quays of the town; but in the southern part of the harbor the water is not so deep, the three-fathom line of soundings being about 600 yards northward of the custom-house. The bottom is everywhere dark soft mud, except in the southern part of the harbor, where it is rocky.

Vessels of war generally moor close to the southward of the mole, between the health office and the fort at the end of the mole Trajano, with an anchor to southward and another to the westward, and the stern secured to bollards on the edge of the mole. Merchant vessels go alongside the town quays, making fast to bollards placed for the purpose.

A mooring buoy, the only one in the harbor, belongs to the P. and O. Company. There are several warping posts in the harbor, constructed by a number of piles being driven into the ground, and firmly secured to each other by braces or crosspieces.

**LIGHTS.**—An intermittent white light, visible forty-five seconds and eclipsed every *forty-five seconds*, is exhibited from a light-house on monte dei Cappucini, three-quarters of a mile eastward of the mole head of Ancona. The light is elevated 407 feet above the sea, and visible in clear weather at a distance of about 23 miles, and between the bearings S.  $79^{\circ} 06'$  E. around by S. to N.  $59^{\circ} 06'$  W. It will not be seen when bearing northward of NW. by W., being then hidden by the high land of mount Conero.

A *fixed red* light is shown from the mole head at Ancona, visible at a distance of about six miles, but the light is *not* exhibited during bad weather.

Also, at 66 yards from the extremity of the breakwater on the S. is a *fixed green* light, visible four miles.

**Ancona Road.**—The anchorage off Ancona is in from eight to 11 fathoms, mud bottom, good holding ground, but only available in fine weather, and is seldom resorted to excepting by vessels prevented from entering the harbor by contrary winds or temporary purposes. A good berth is in eight fathoms, mud, Falconara, a small town, bearing SW. by W., and the light-house on the mole S. by E.  $\frac{1}{2}$  E. one mile. This anchorage is exposed during a bora and in SE. winds, which raise a heavy sea.

**DIRECTIONS.**—Mount Conero is a good mark for Ancona either from the N. or the SE.; in clear weather, in the offing, mount St. Vicino, one of the highest of the Apennine chain, and whose conical shape is remarkable, will also be seen about 27 miles southwestward of the town. In foggy weather, however, when proceeding from the eastward or from

the coast of Dalmatia, care should be taken not to confound mount Ardizza, near Pesaro, with mount Conero; the latter is higher, and may, moreover, be easily distinguished by the objects on it already described; portions of the land near it are not unlike the elevated ground in the vicinity of the Needles, S. coast of England.

On nearing the land the light-house on monte die Cappucini will be recognized; then the town, and lastly the mole head. Care must be taken to guard against the current, which sets strongly to the south-eastward in the vicinity of Ancona point; at night, the *red* light on the mole head kept southward of a SW. by S. bearing will lead clear to the westward of the Volpe rock. In rounding the mole head or *red* light at night, a berth of at least 100 yards should be given to it, and after entering the harbor, a vessel should anchor according to her draught.

At night, on such rare occasions as when the *red* light on the mole head is not exhibited, vessels must be guided by the fixed *green* light on the breakwater or S. mole head, which should not be approached nearer than 100 yards.

• **COAST.**—From Ancona the shore is low and sandy as far as the town of Sinigaglia, about 13 miles northwestward of Ancona; it is intersected by several rivers, the most important of which is the Esino, running into the sea about  $5\frac{1}{2}$  miles from Ancona, and which has its source in the Fabriano mountains. Fishing boats ascend the river at high water. It has been already observed, that this shore is bordered by shallow water to the distance of half a mile, where the depth is only two and three fathoms; it should, therefore, be carefully avoided.

The high lands in the interior, which will serve to distinguish this part of the coast, are, after mount Conero, that of Montagnola, in the shape of a sugar-loaf, with a tower and a few houses on its summit, mount Barcaglione, with a convent and some houses on it; and mount Falconara, which is of greater elevation than the first, and of similar shape, with numerous buildings and a castle on its summit; the last is south-eastward of and near the mouth of Esino river.

• **SINIGAGLIA.**—The town of Sinigaglia, ancient *Sena Gallica*, is at the margin of the sea, on the right bank of the Misa river, and between two fertile hills; it is large, and remarkable for its ancient rampart and capacious storehouses, which contain great quantities of merchandise of every kind in July and August, the period of the great fair that is annually held here. The town has a population of about 8,000 persons. Provisions and water may be obtained in abundance. Vessels of 120 to 150 tons burthen are built here.

The harbor is at the mouth of the Misa. Two quays bordering the

banks of the river form a basin about 866 yards in length, at the entrance of which is a depth of  $6\frac{1}{2}$  feet shoaling to less than two feet within; it is capable of holding many coasting vessels, which are well secured to the quays on account of the current, which is very rapid during the freshets.

**LIGHT.**—A *fixed* white light is exhibited from the extremity of the stone mole, on the eastern side of entrance to the port of Sinigaglia; it is elevated 45 feet above high water, and visible in clear weather at a distance of six miles. On the wooden extension of the mole is a white light, visible two miles, which is changed to *green* when the torrent of the Misa impedes the entrance.

**Directions**—In clear weather the peaks of Catria mountain, 5,581 feet high, will be seen from a great distance, and are useful in making the land when bound to Sinigaglia; this mountain bears SW. by W. 27 miles from the town, and has a forked summit. On approaching nearer, the village and steeple of Scapezzano, on a hillock three miles W. by N. of Sinigaglia, will be seen; also the village and tower of Albani, on another hill two miles to the southward; and lastly, the town of Sinigaglia, and the light beacon on the eastern mole, which should be brought to bear S. when the soundings are four or five fathoms.

A depth of  $5\frac{1}{2}$  to  $6\frac{1}{2}$  feet will be found, at high water, in the passage between the moles, but the banks at the mouth of the river occasionally change their position. In fine weather coasters anchor off the harbor at about a third of a mile northeastward of the light beacon. The number of vessels which resort hither at the time of the fair is so great that the harbor cannot contain them all, and many anchor outside the jetties, prepared to weigh for Ancona on any symptom of a bora.

**FANO.**—The coast from Sinigaglia to Fano,  $11\frac{1}{2}$  miles farther on, is bordered by a bank. Cesano river, which rises at the foot of mount Catria and the Metauro, which descends from the Apennines, here reach the sea, and their rapidity is often so great that the mud brought down discolors the water to a great distance; these rivers are not navigable.

The town of Fano stands on the right bank of the northern arm of the Metauro, and is surrounded by well-cultivated hills. Its numerous edifices and steeples give it the appearance of a large town; it has about 8,000 inhabitants, and contains large silk manufactories, but it affords few supplies for shipping.

The port of Fano is formed by the mouth of the northern arm of the Metauro, along the banks of which are quays, but it is little frequented, being so much encumbered with sand as to render it often impracticable. The bed of the port is a mixture of gravel, mud, and large stones. The entrance is between two jetties; about 100 yards within the extremity

of the easternmost is a light-tower. Large vessels anchor in fine weather at  $1\frac{1}{2}$  miles from the shore. Viewed from about eight miles to the eastward, the bridge over the southern arm of the Metauro will be seen to the left of the town of Fano.

**LIGHT.**—A circular reddish tower, about 130 yards within the entrance and on the eastern side of the port of Fano, exhibits, at an elevation of 58 feet above the sea, a *fixed* white light, visible in clear weather at a distance of four miles.

**COAST.**—Mount Catria or Caia, the high, forked mountain, is a good mark for making this part of the coast; on nearing the land, vessels will be guided by mount Giove, 840 feet high, on the summit of which is a large monastery with a high steeple bearing SW. two miles from Fano; also by mount Novillara, on the wooded summit of which are a small village, and a round tower which bears W.  $\frac{1}{2}$  N.  $3\frac{1}{2}$  miles from Fano; and lastly by the town of Fano.

From Fano the coast suddenly rises, the hills from mount Novillara (780 feet high) and Ardizza run down to the edge of the sea. When seen in line from a distance, these two mounts resemble Conero; they are lower than the latter but, like it, their greatest elevation is on the SE.; they become depressed on the NW., where mount Ardizza terminates in a perpendicular cliff, on which stands a house with a semaphore. The shore between Fano and Pesaro, nearly seven miles to the NW., is bordered by a bank, but which does not extend beyond the distance of about half a mile, where there is a depth of two fathoms.

**PESARO.**—The town of Pesaro stands near the sea-shore in the valley formed by mount Ardizza, southeastward, and mounts Fiorenzuola and Mezzo, northwestward; this latter hill is 755 feet high. The population is about 10,500 and it contains silk, porcelain, crystal and other manufactories.

The port at the foot of mount Ardizza is only a small channel formed at the mouth of the Foglia river, which takes its rise at the foot of mount Sasso Simone. The channel is more than three-quarters of a mile in length, and the entrance is between two jetties; the depth between them is about six feet, sandy bottom, which gradually decreases through the greater part of the channel to near the inner end, where less than two feet water will be found. The port will hold a large number of small vessels.

At 250 yards eastward of the main entrance is another mouth, but shallow, between two piers or jetties; near the extremity of the eastern is a square, reddish light-tower.

Mounts Ardizza and Fiorenzuola are each crowned by a village, and serve as marks for Pesaro. On approaching the coast the town and

light-tower will be seen. Vessels of large draught may anchor in fine weather at  $1\frac{1}{2}$  miles from the land, in  $5\frac{1}{2}$  and  $6\frac{1}{2}$  fathoms mud bottom.

**LIGHTS.**—At the E. mouth a *fixed* white light is exhibited from the tower on the eastern jetty. It is elevated 47 feet above the sea, and should be seen in clear weather from a distance of 10 miles.

On the E. pier at the main or western entrance to Pesaro is exhibited a 4th-order dioptric light, visible three miles. The light is elevated 46 feet above the level of the sea, and shown from an octagonal, reddish, masonry tower.

**Cattolica.**—The shore from Pesaro to Rimini, 17 miles farther on, is intersected by many rivers, amongst which the Conca is the only one of any importance, fishing boats being able to ascend it at high water. To the westward of the high land of Fiorenzuola and Mezzo the coast forms a bay, near the shore of which is the village of Cattolica. Small vessels anchor off the shore between the mouth of the Conca and Gabice village, and are sheltered from westerly and southerly winds by the land of mount Mezzo, but quite exposed to those from the south-eastward round by E. to NW.; southwesterly winds give rise to violent squalls.

In approaching the anchorage off Cattolica from the NE. a vessel will have on her port bow the high hills of Gradara and Luro, on the summits of which are some steeples, visible at a considerable distance; also mounts Fiorenzuola and Mezzo, the base of which is washed by the sea. On nearing the coast, Cattolica and the tower at the mouth of the Conca will be seen.

**LIGHT.**—At the extremity of the jetty at Cattolica is a small red tower, which exhibits at 29 feet above the sea a *fixed* light showing *red* to seaward, and white on the sides, visible three miles.

**RIMINI.**—The town of Rimini stands on the right bank of the river Marecchia, at the foot of fertile hills; its harbor was formerly of great celebrity. A fine marble bridge of five arches, having a span of 27 feet each, over the river, at the head of the harbor, and a triumphal arch erected to Augustus, still remain. It is a walled town, with a population of about 17,500 persons; it has manufactories of silk and of sulphur, and carries on a trade in salt fish.

The mouth of the Marecchia is 17 miles to the NW. of Pesaro; the river rises in the Apennines, and is navigable for about a mile to the W. of the town of Rimini. The channel through which it discharges its waters into the sea forms the small harbor of Rimini, which is bordered by quays to the walls of the town. The depth is not more than six feet at the entrance, which is between two jetties projecting seaward, and in places only half the above depth can be carried up to the



town. The harbor will accommodate numerous small vessels, which moor to the quays; but it is continually encumbered after excessive rains by gravel and flints brought down by the current, which occasionally is sufficiently rapid to cause the vessels fastened to the quays to break adrift. It is likewise of difficult approach, owing to the strong currents and the shoals at its entrance, which frequently vary in form and position.

**Supplies.**—Provisions, water, canvas, and rope can be obtained, and small vessels, that can navigate the port, are built here.

**LIGHTS.**—Two *fixed* white lights are shown from the E. side of entrance—one at the end of the pile jetty, 25 feet high, visible four miles; the other on the stone mole about 400 yards within the end of the pile jetty, 66 feet high, and visible 11 miles.

**Directions.**—When standing in for the land in the vicinity of Rimini, vessels will, in clear weather, sight the high lands of Carpegna, and to the southward of the latter, mount Sasso Simone, which is less elevated and has the appearance of being crowned by a wall. Mount San Marino (2,455 feet) will next appear in view; it will be easily distinguished by its elevation and by the houses and four towers on its summit. The town of Rimini will afterwards be seen, as well as the light-tower, which should be steered for.

**The COAST** from Rimini to Cesenatico, about 11 miles farther on, is sandy, very low, and difficult of access even for fishing boats, owing to the banks formed by the numerous streams which discharge along it.

The river Uso, the entrance to which is six miles to the northward of Rimini light-house, may be ascended by fishing boats at high water when the sea is smooth. The village and tower of Pedrera, as well as Bellaria and its tower, which stands at the mouth of the Uso, are the only remarkable objects on this part of the coast.

**Cesenatico.**—This harbor, like Rimini, is an artificial channel, formed by two piers projecting about 100 yards seaward at right angles to the shore, and is of difficult access, owing to banks at the entrance. It will contain many small vessels, and, notwithstanding its smallness, is the chief harbor on this part of the coast; it is, however, silting up and depths of not more than about  $3\frac{1}{2}$  feet, mud bottom, will be found at low water at the entrance or inside. Cesenatico is the port of the town of Cesena, on a hill 545 feet high, distant about eight miles to the westward at the foot of the Apennines. Population, 2,000. The Carpegna mountains, with flat summits and wooded sides, southwestward of Cesenatico village, are good landmarks for pointing out its position; as is also mount San Marino, 16 miles to the southward.

**LIGHTS.**—Two *fixed* white lights are exhibited from the eastern

side of entrance to Cesenatico—one at 127 yards from the extremity of the pier, 36 feet high, visible four miles; the other 545 yards within the extremity, 26 feet high, and visible four miles.

**Cervia.**—The entrance to this little port is four miles to the northward of Cesenatico; the port is formed by an artificial channel, which collects the waters from the surrounding mountains, retaining those of the sea by means of a sluice. Surrounded by salt marshes, it is now almost silted up, there being scarcely  $1\frac{1}{2}$  feet in it at low water. The town of Cervia stands on the right bank of the channel, and contains about 4,000 inhabitants, who are chiefly occupied in preparing salt from the marshes; about 50,000 tons are annually produced. The salt is kept in large storehouses, and constitutes almost the entire trade of the town. Cervia is considered a very unhealthful place.

**LIGHT.**—A *fixed* white light is shown within the entrance, and on the SE. side, at Cervia, to indicate the outer anchorage; the light is visible in clear weather three miles.

**COAST.**—The Carpegna mountains and mount St. Maripo, distant 20 miles southward of Cervia, serve as marks for the land in its vicinity. On approaching, the light or the village of Cervia, which is at the southeastern extremity of a large pine forest, will sufficiently indicate the entrance of the channel to the port.

The vast pine forest, the finest in Italy, which commences at two miles southward of Cervia, covers the coast for about 18 miles, nearly as far as Primaro, and extends two miles inland. On the whole of this extent the coast is sandy, low, and everywhere intersected by marshes and streams, which render it uninhabitable. The high lands that border the coast nearer Ancona disappear almost entirely beyond Cervia, nor are the Apennines any longer seen a short distance inland.

Between Cervia and Ravenna, distant  $10\frac{1}{2}$  miles, access to the coast is obstructed by banks of mud and sand brought down by the Savio river, which reaches the sea at three miles from Cervia, and by the Rouco and the Montone united, the mouths of which, accessible to small fishing boats, lie about half a mile southward of the parallel of Ravenna. At about a mile from the shore there are  $2\frac{1}{2}$  fathoms water.

**Anchorage.**—The coast between the Savio and the Montone forms a slight bay called Bevano, at the head of which is a marsh which is gradually filling up. Coasting vessels anchor in this bay to the NW. of Savio point, which slightly protects them against southerly winds. The two towers of Ghiare on the S., in the middle of the marsh, and Torrazza on the N., point out the position of the bay.

**Ravenna.**—This town, which originally stood on the sea-shore, is on an eminence four miles from the sea, and on the border of the forest

above mentioned. It is a large town, containing about 15,000 inhabitants, with a silk manufactory, and rather an important trade. The country around is marshy; fresh water is very scarce.

The harbor no longer exists; its remains, two miles to the NW. of the mouth of the Ronco and Montone, are scarcely to be traced. On approaching the land near Ravenna from the eastward the water shoals regularly; the coast line being very low, the domes and towers of the churches at Ravenna are distinctly seen amidst the surrounding trees at the distance of eight miles from the shore. Corsini, distant  $5\frac{1}{2}$  miles to the NW. of the mouth of the Ronco, now serves as the port of Ravenna, the communication between the two being by a canal.

Ravenna is rich in antiquities of the early Middle Ages, having been the residence of the emperors of the West from the time of Honorius, and the capital of Italy under Odoacer, Theodoric and the succeeding Gothic kings, the Byzantine monarchs, the Lombards and the Greek exarchs.

**Port Corsini** is merely the mouth of the canal, which commences at Ravenna, and during a course of six miles is fed by the waters of the neighboring marshes. Vessels of 70 to 80 tons burden ascend it with the flood as far as that town. The depth of water at the entrance is preserved by two piers which project seaward upwards of 650 yards; the least depth is 10 feet, which can be carried up the channel to Ravenna. Near the end of the southern pier is the harbor light-house; and on the S. side of the canal, about half a mile within the end of the pier, is the main light-tower rising from a large square building, 80 feet high, of a dark color, and distinctly seen 10 miles; also the pilot station. The mark for the entrance of the channel is the two lights in line.

**LIGHTS.**—On the S. side of Corsini canal, and nearly half a mile within the light-house near the pier end, is the main light-tower, which exhibits an *intermittent* white light, visible for a half minute, and *eclipsed half a minute*, and seen in clear weather from a distance of 15 miles.

Also, at 24 yards from the end of the S. pier, is shown a *fixed* white light, visible in clear weather five miles.

**Coast.**—In standing in to make the land at Corsini, or at this portion of the coast, which is flat, and only visible at a short distance, the first town that will be sighted, before the pine forest, is that of Bertinoro, on a hill 1,115 feet high, 12 miles westward from Cesenatico, and about 17 miles southwestward from Ravenna. The latter will subsequently appear behind the trees, and at last on the beach will be seen the houses of Corsini, and the light-tower, which stands quite alone.

The only remarkable object between Corsini and Primaro, distant six miles to the northward, is an isolated tower, three miles from the en-

trance to Corsini, and which points out the mouth of the river Lamone, which is generally choked.

**Po di Primaro.**—Vessels of 70 to 80 tons burden ascend this branch of the Po, and which is a continuation of the Reno as far as Faenza channel, distant nine miles from the coast; and those of 18 to 20 tons ascend as far as Tragetto, which is 21 miles farther. At the entrance is a semaphore and electric telegraph station.

The passage is obstructed by banks which extend off some distance, through which the depth is only about six feet at low water; these banks occasionally change their position. The entrance should only be attempted at flood tide.

The semaphore of Primaro, some buildings close to it, the round tower two miles to the S., and two tall trees on the N. side of entrance, point out its position. The village of St. Alberto, on the right bank of the river,  $5\frac{1}{2}$  miles from the sea, is the center of the trade of Ferrara with the coast; it possesses good storehouses, and provisions are abundant.

**Comacchio.**—To the northward of the semaphore of Primaro, the coast is a mere strip of low land, occasionally cultivated, but generally formed by a series of small sand hillocks, which separate the sea from the great Comacchio lagoon. The lagoon, fed by the waters of the sea which enter at port Magnavacca leading to the Pallotta canal, embraces an area of 150 square miles, and has a depth of about three feet in every part, over a clay bottom.

The small fortified town of Comacchio, in the midst of unhealthful salt marshes, is on the Pallotta canal, about  $2\frac{1}{2}$  miles from the coast, and is surrounded by canals on every side. Its inhabitants, about 6,000, carry on a considerable trade in salt fish, and particularly in eels, with which the lagoon abounds. Provisions are plentiful, but water is scarce. Fishing-boats are constructed here.

Comacchio lagoon is entered at port Magnavacca, thence by the Pallotta canal. The waters of this canal are influenced by the tide, and during the months of February, March, and April, their depth increases to about two feet. Vessels of not more than 50 tons burden enter port Magnavacca, and smaller ones ascend with the tide as far as Comacchio, by means of the Pallotta canal.

A red tower, nearly  $1\frac{1}{2}$  miles to the westward of the entrance to port Magnavacca; the church steeple of Comacchio, about three miles north-westward, and the semaphore of Primaro indicate the position of the entrance to the port.

**LIGHT.**—Near the mole at the N. side of entrance to port Magnavacca is exhibited a *fixed* white light, visible three miles.

**Anchorage.**—Vessels anchor in five fathoms water, at a distance of

about  $2\frac{1}{2}$  miles from the coast, between ports Magnavacca and Volano, eight miles northeastward. The anchorage is good with off-shore winds; but exposed with those between NE. and S. In approaching this low shore the lead should be kept going.

**Port Volano** is the outlet of the Po di Volano, which runs into the sea on the western shore of Goro road. This branch of the river, after receiving the waters of the Poatello, and of the various canals which unite under the walls of Ferrara, is called the Po di Volano. Small coasting vessels of 30 tons burden ascend the Po di Volano as far as Codigoro village, where a few supplies may be obtained; thence they go as far as Ferrara.

A tower and a few houses indicate the entrance of port Volano; also a large forest of pine and oak trees, which, beginning at the tower, extends  $4\frac{1}{2}$  miles to the northward. The entrance is round a tongue of sand which runs parallel to the coast, extending nearly  $1\frac{1}{2}$  miles to the northward of the tower.

**GORO ROAD**, or Sacca dell' Abate, is the name given to a bay three miles deep and of semicircular shape, commencing at port Volano and terminating on the E. by the low land at the mouth of the Po di Goro. The whole of the head of this bay is encumbered by soil deposited by the several mouths of the Po. The anchorage in Goro road is considered to afford good shelter against winds between ENE. round by N. to the southwestward: the bottom is a mixture of mud and clay, and it is often difficult to weigh the anchor when the precaution of occasionally sighting it has not been taken.

In seeking shelter in this bay, it must be borne in mind that shallow water for anchoring extends a long way outside what may be considered the limits of the bay. With Goro light-house bearing NE.  $\frac{1}{2}$  N. distant  $3\frac{1}{2}$  miles, the depth of water is only about  $5\frac{1}{2}$  fathoms; and farther in towards the head of the bay, with the light-house ENE. three miles, the depth is  $3\frac{1}{2}$  fathoms.

**The Po di Goro** is the name given to a branch of the Po which leaves the principal stream about a mile westward of the village of S. Maria in Punta, and discharges at the SE. extreme of Goro road, after a course of about 26 miles. Between its mouth and principal stream are the villages of Gorino, Goro, Mesola, and Ariano. After its junction with the Po Grande, vessels ascend as far as Ponte-lagoscuro, where the channel is taken for Ferrara. At the entrance to the Po di Goro there are about six feet water, but the depths frequently change by the sand and mud brought down the river. The channel is generally marked by poles, but strangers wishing to enter the river should take a pilot.

Near Punta di Goro is a circular light-tower 60 feet high, rising from

the keeper's dwelling, and the whole is of a reddish color; at nearly three miles to the NW. by N. of the light-tower will be seen the church steeple of Gorino; also at about nine miles to the W. by N. of the light-tower, the tall steeple of Pomposa, terminating in a sharp point, and to the left of it Volano tower. These objects will serve to identify the land.

**LIGHT.**—The light-tower on Goro point, the SW. side of entrance to Po di Goro, exhibits, at 66 feet above the sea, a *fixed* white light visible in clear weather from a distance of 11 miles. The light is useful to vessels seeking Goro road or Sacca dell' Abate, in a bora or NE. gale.

**The Delta of the Po**, as far as it protrudes beyond the general trend of the coast line, may be considered to begin to the southward at two miles N. of Volano, and extends northward to port Caleri, a direct distance of about 16 miles, but 30 miles as measured along the coast. The soil conveyed from the interior, and deposited in the sea, has, in the course of ages, greatly changed the configuration of the coast, and the eastern extreme is about eight miles in advance of the usual line of shore. The general character of the land is a flat marsh.

**The Po Della Gnocca** is a branch of the Po which enters the sea at about  $1\frac{1}{2}$  miles northward of Goro point. Its mouth is generally preferred by boats proceeding to Venice by the inland channels, in order to avoid rounding Maestra point, and the navigation of a difficult and, in the winter season, dangerous coast. The shoals off the mouth frequently shift their position, and piles are placed to indicate the channel, which has about five feet water, but deepens considerably within. A pilot is required.

Pellazza bay is a large shallow indentation to the northward of the Po di Goro, and open to the SE. From a depth of 12 feet at  $1\frac{1}{2}$  miles southward of Goro light-house, the same soundings in a wave line trends in a NE. by E. direction across the mouth of the bay, and nearly  $1\frac{1}{2}$  miles to the SE. of the mouth of the Po delle Tolle.

**Anchorage.**—There is good anchorage in northerly and westerly winds in about  $5\frac{1}{2}$  fathoms water, with Goro light-house bearing SW. by W.  $\frac{1}{2}$  W., and Gorino village steeple W. by N. As the water shoals suddenly, care should be taken not to stand too far in. In cases of necessity, vessels may anchor off any part of this coast; the holding ground is good.

H. M. S. *Bacchante* rode out a very heavy bora gale off the mouth of the Gnocca, in  $8\frac{1}{2}$  fathoms, in company with the *Mercury* and several prizes. The boats filled their water casks in a depth of four feet.

**PO RIVER.**—The various mouths of the Po, which may be considered eight in number, including the Po di Volano, embrace an extent of about 26 miles of coast, the northwestern of which is the Po di Maestra.

The river has its source in the Grisons Alps at monte Viso, and after having flowed 280 miles from Turin eastward, reaches the gulf of Venice, receiving in its course the waters of several small streams. Lombardy, which it intersects, is entirely an alluvial black fertile soil of great depth, and is one of the richest plains in the world.

From Piacenza to Papozze and Serravalle villages, 19 miles below Ponte-lagoscuro (the port of Ferrara), the river flows between embankments; it bears the name of Po Grande till it reaches these villages whence it divides into the Po dello Maestra and the Po di Goro, which are now the chief navigable branches.

Between Pellazza bay and Maestra point there are three mouths which lead to the Po delle Tolle, a continuation and outlet of the Po Grande or Po della Maestra. They contain numerous sand banks, and as there are scarcely any recognizable objects, the navigation of them is difficult, even for those with local knowledge. The four practicable passages have but sufficient depth for vessels of about 22 tons burden.

## CHAPTER VI.

### MAESTRA POINT TO PORT BUSO.

VARIATION IN 1883.

Po di Goro,  $11^{\circ} 04'$  W.

Port Buso,  $10^{\circ} 44'$  W.

**The COAST** between Maestra point and port Buso, northeastward, embraces an extent of about 80 miles. It is a low, sandy shore, along which numerous rivers empty into the sea, forming by their mouths nearly all the ports which it affords. The navigation off the low shallow shore between Goro road and Chioggia requires great caution.

**MAESTRA POINT** is very low, consisting of marshy lands, divided by streams into a vast number of islands, which frequently change their form, especially after heavy winter rains, and in spring at the melting of snow. There are, however, trees near it close to the coast, which can be seen at a distance of five miles. It is advisable to avoid closing the shore, as shoal water extends off a considerable distance; the shallow bottom may be readily distinguished in the daytime and fine weather by the discoloration of the water. A haze generally hangs over the coast, and it should be approached with great caution. The position of Maestra point is about 11 miles N. of the parallel of Goro light-tower; it is not at all salient, but a small signal tower stands on the low shore.

**The Po della Maestra** is the northwestern branch of the Po; its mouth is about five miles northward of Maestra point. Access is extremely difficult, as the sand banks frequently shift, and the current is very rapid; the passage is in places marked by piles, and the depth at the entrance is about three feet.

Contarina church steeple is a good distinguishing mark for this part of the coast; it is white, and eight miles WSW.  $\frac{3}{4}$  W. from the mouth of the Po della Maestra.

**The COAST** between Maestra point and Sottomarina battery, at about a mile from the entrance of port Chioggia, is a low sandy shore, bordered at a long distance by shoal water; soundings extend off everywhere, and the shore may be approached with prudence by the lead.

Port Levante is the mouth of the Po di Levante which joins the Bianco canal; the latter leads to Adria and Astiglia, and communicates by channels with the Adige and Po Grande. It has sufficient depth for



vessels of very light draught only, and the sand banks at its entrance often change position, where there is about six feet water. The village of Levante is on the S. side of entrance to the river.

Port Caleri,  $2\frac{3}{4}$  miles to the NW. of port Levante, is a small passage leading to the interior.

**PORT FOSSONE.**—The river Adige, one of the chief rivers of Italy, rises in the Swiss Alps, traverses the Tyrol, passes by Trent and Verona cities, and reaches the sea about  $4\frac{1}{2}$  miles southward of port di Chioggia. It communicates with the lagoon ports, and is navigable by boats as far as Verona, and those of very light draught ascend to a short distance above Trent.

The mouth of the Adige is called port Fossone; it is fronted by sand banks, and a passage through them carries about three feet water into the river. The soundings about  $1\frac{1}{2}$  miles off the river are five and six fathoms; within this depth the water is shoal.

**PORT BRONDOLO.**—The river Brenta has its source in the mountains between Trent and Belluno, and flows over a flat country from Bassano to the sea; it enters a navigable canal leading from Padua to Venice, and at Dolo the river trends to the southward and runs into the sea at port Brondolo. The Brenta communicates by canals with Chioggia, Padua, Vicenza, the Adige, and the Po.

Port Brondolo is the mouth of the Brenta, and is only about half a mile northward of the mouth of the Adige: it is obstructed by sand banks, which are common to the mouths of both rivers. Fort Brondolo is three miles from the sea by the Brenta, and about a mile from the coast, and where several canals or streams meet. When the river is swollen by rains, strong eddies are formed at the entrance.

**The COAST** between Maestra point and port San Nicolo del Lido, a distance of about 30 miles, is extremely low, and intersected by marshy lands, which render the air insalubrious during the summer; the largest of these marshes forms the lagoons of Venice and Grado.

The only sea marks on this coast are the steeples of some of the more important villages, and it is bordered by shoal water, the depth at  $1\frac{1}{2}$  or more miles from it being about  $5\frac{1}{2}$  fathoms.

The lagoons are scattered with islets of varied and pleasant aspect, which rise little above the level of the water. These islets are about one hundred in number; twenty-five of them are inhabited; the city of Venice is built upon the largest of them. These lakes or lagoons form a basin, the length of which, from N. to S. is about 25 miles, and which is separated from the sea by a long strip of land forming the *Lido*, a natural sea-wall consolidated by artificial means, which serves also as a protection to the inner anchorages.

There are five passages leading to Venice, which are called ports, viz, ports Brondolo, Chioggia, Malamocco, St. Erasmo, and Tre Porti. The lagoon ports, some of which are gradually becoming shoaler, are the mouths of existing rivers, or of former beds.

The navigation of the lagoons and of the various channels between them is in a great measure carried on by tracking boats; pilots are generally employed, and the winding passages are marked by piles. The flood tide enters with rapidity, and speedily spreads over the scattered ponds and muddy morasses; so that at high water the scene is strangely changed, presenting one vast sheet of water, which reaches from the islands on the coast to the mainland.

The coast between Brondolo and the entrance of port Chioggia has nothing conspicuous but the steeple of the small Madonna di Marina chapel, and to the northward of this, Sottomarina village and Chioggia town.

**PORT CHIOGGIA** is the mouth of the Perognola canal, which is fed by the waters of the lagoons, and of several smaller canals, and reaches the sea between fort St. Felice on the S., and fort Caroman on the S. end of Pelestrina island. This part of Pelestrina is bordered by a shoal, which reduces the passage into the port to a width of about 400 yards. The coast bank fronting the entrance to the port carries over it 12 and 13 feet water, into a hole or well immediately N. of fort St. Felice, where the depth in one place is as much as 18 fathoms; thence a narrow channel close along by the fort leads southward to the anchorage, which is well sheltered.

The average depth in the port may be from 10 to 30 feet, though in places along the southern shore the water is deeper.

Vessels lie southwestward of fort St. Felice; but it is desirable, when a long stay is intended, to warp inside Perognola canal, which is the real port of Chioggia.

The town is built upon an island, and contains about 24,000 inhabitants. It is traversed by a fine road, and by a canal crossed by nine bridges; it contains several ship-building yards, and fishing is largely carried on.

The various channels which meet at Chioggia and communicate with the Brenta and Malamocco, can be taken by small coasting vessels only.

Chioggia has the advantage over the other lagoon ports, except Malamocca, of a greater depth of water at its entrance, which however is often impracticable; a heavy sea is raised by northeasterly, southeasterly, and easterly winds, and the current is frequently very strong; it is advisable to take a pilot.

**Tides.**—It is high water, full and change, at port Chioggia, at 10h. 30m.; and the rise is about two feet.

**LIGHT.**—In fort St. Felice is a tower, which exhibits, at 52 feet above the sea, a *fixed* white light, visible at a distance of nine miles.

**DIRECTIONS.**—Vessels bound to Chioggia should approach the low coast with caution, being guided by the lead. The high land in the vicinity of Padua is rarely visible, and the two objects which first present themselves are generally the steeple of Pelestrina, about  $2\frac{1}{2}$  miles to the N. of the entrance, and that of the tower of Chioggia, which is high and terminated by a long arrow-shaped vane. To the S. of Chioggia the steeples of Brondolo and Madonna di Marina chapel, and on a near approach to Chioggia the forts of St. Felice on the S. and Caroman on the N. side of entrance will be seen.

Vessels detained by contrary winds, or waiting for the flood tide, anchor in about eight fathoms, mud and sand, off the entrance at about two miles from the shore, with Pelestrina steeple bearing about NNW. and the steeple of Madonna church SW. by W., but this anchorage cannot be recommended excepting in fine weather, or with off-shore winds, as there is at other times a heavy sea.

The lead should be kept constantly in use by vessels approaching or quitting Chioggia, and it is not prudent to stand too far towards the shore when to the northward of Maestra point.

**Pelestrina Island.**—Between Chioggia and port Malamocco the lagoon is protected seaward by Pelestrina, a narrow sandy island, six miles in length, which is thickly peopled and well cultivated. The part near Chioggia presents nothing remarkable, but beyond Pelestrina village, the steeple of which is one of the most conspicuous objects on this portion of the coast, the island is covered with houses, and at the northern part will be seen the tower of porto Secco, the church of San Pietro in Volta, the new tower, and San Pietro fort, at the entrance to Malamocco.

A high sea wall of limestone extends along the shore, and protects the inner channels and anchorage. The sand banks along the shore of Pelestrina are changeable in form and extent.

**PORT MALAMOCCHO**, by far the most important and most frequently visited of the lagoon ports, forms the entrance to the only passage to Venice, at about seven miles distant, for large vessels. Its central position also gives it an advantage, as vessels overtaken by strong northeasterly or southeasterly winds, which are very dangerous on this coast, and unable to enter the port, can always in cases of necessity anchor in Pelorosso road, or put to sea, and seek shelter under the shore of Istria.

The port is formed at the outlets of the Fisolo, Rocchetta, and Spignon channels, and has sufficient space for a considerable number of vessels. One anchorage is on the S. side, between San Pietro channel and San Pietro bastion, at nearly 400 yards to the NE. of the latter; another is more towards the NW. part of the port, in about four fathoms, at the mouth of the Spignon channel, and in proceeding to it pass to the S. and westward of the beacon off fort Alberoni; a third place is at the entrance to Fisolo channel, at the N. part of the port.

The entrance to the port is between fort San Petro on the S. and fort Alberoni on the N. The entrance, like all the ports on this coast, is obstructed by sand banks, which, besides diminishing the anchorage space, render access difficult in a sailing vessel without a fair wind and fine weather.

The channel into the port with the leading marks on, carries 28 feet at low water, and is between two piers or moles, the northern projecting seaward upwards of a mile from the shore of fort Alberoni, which, with the current at times running three miles an hour, tends to scour the channel and keep it clear.

Vessels of war are not allowed to proceed to Venice without permission from the port Admiral. It will therefore be convenient to make fast to one of the buoys at port Malamocco, where the powder must be discharged, as no vessel can go beyond the public gardens at Venice with powder on board.

The semaphore and electric telegraph station is the pilot tower at Alberoni, at the S. end of Malamocco island. It is designated by black and white horizontal stripes.

**Tides.**—It is high water, full and change, at Malamocco, at 10h. 30m.; springs rise from  $2\frac{1}{4}$  to four feet. The tide enters by both the northern and southern passes, the streams meeting near Poveglia island. The strength of the current is variable; in the passes of Lido and Porto di Malamocco it runs at times three miles an hour. At Venice, it is high water, full and change, at 11h. 15m. A strong SE. wind, during a spring tide, causes an extraordinary rise and sometimes overflows the quays of the town.

**LIGHTS.**—At the extremity of the N. mole, at the entrance to port Malamocco, is a white octagonal tower of two diameters, the upper considerably smaller than the lower, and surmounted by a lantern, from which is exhibited at 38 feet above the sea, a *fixed* white light varied by a *red flash* every *fifteen seconds*, and visible nine miles.

The Rocchetta light-house on the curve of the sea-wall SW. of fort Alberoni, is an isolated brick tower, which shows at 81 feet above the sea a white light showing a *flash* every *thirty seconds*, and visible 15 miles.

On the S. bank at entrance to Spignon channel, is a *fixed green* light, visible five miles.

**Pilots.**—Government regulations oblige vessels to take a pilot at port Malamocco, when bound to Venice or up any of the various channels. A pilot taken on board at the port or at sea is not allowed to pilot a vessel farther than the town of Malamocco, where another pilot for Venice must be employed, and where he must be discharged on the vessel's way down.

**VENICE** is built upon 72 islets or shoals upon foundations of piles and stone. It stands near the center of a lagoon extending from Bron-dolo on the S. to near Piave, a length of 30 miles by a breadth of five miles. This city is divided into two unequal portions by the *Canalazzo* or Grand canal or channel, the course of which is NW. and SE., in the form of the letter S; it is further intersected by 146 smaller canals or channels, termed *rii*, which are crossed by 306 bridges. The small canals serve as streets, on which some 9,000 gondoliers or boatmen gain their livelihood.

Venice is the best built and the most populous city in the Adriatic, and contains upwards of 130,000 inhabitants, and about 10,000 temporary residents. It is connected with the mainland at Mestre by a viaduct, carrying a railway 3,936 yards long. The pride of the Venetians is the Piazza di San Marco, distinguished by its campanile and stately edifices; the cathedral of San Marco is one of the finest in Europe. A naval arsenal with a graving dock is at the eastern end of the city. The commerce of Venice, which once embraced every known part of the world, is now in a reduced state. In 1875, the total number of vessels of all nations, including coasters, that entered Venice amounted to 2,751, equal to 531,010 tons. The value of the imports was 4,810,794*l.*, and that of the exports 2,554,381*l.*

**Dock.**—The graving dock at Venice is 295 feet in length, 59 feet in breadth at the entrance, and 20 feet deep at high water.

**Water** of indifferent quality may be obtained from the arsenal. Rain water is preserved in cisterns, and recourse is had to the Brenta river. Several artesian wells are sunk in the town; water is also brought in from the river Sile by pipes along the railway viaduct. Vessels of war are accommodated with a Government tank vessel when required.

**DIRECTIONS.**—If off Porto di Malamocco in the evening and not intending to enter the port, and with too fresh a breeze for anchoring, it would be advisable to keep 10 or 12 miles to the eastward under easy sail, taking care when standing in not to allow the vessel to be set too near Maestra point by the southwesterly current. Time of tide and draught of water are particulars which should be considered with ref-

erence to these ports. It would not be prudent to proceed in a sailing vessel with a strong northeasterly or southeasterly wind.

By day, in clear weather, in approaching the coast, the buildings of Venice, and the tower of San Marco, 323 feet high, will be seen; the belfry of this tower is terminated by a pyramid, surmounted by the figure of an angel. The steeples of Pelestrina and Chioggia will be subsequently sighted, and lastly the forts at the entrance, and high walls which border the lagoons. The pilot house and semaphore station, an isolated square building with a tower on it, about 80 feet above the sea, and about a mile northward of the entrance of the port, is also a marked object.

When the atmosphere is very clear the Euganean hills in the rear of Venice are visible. On a near approach to the port by night, the different lights will be observed, and if it is intended to enter the channel, the Spignon *green* light should be brought in line with the *fixed* white light of Rocchetta, on the curve of the sea-wall on the N. side of the port. The lights in line bear WNW.  $\frac{1}{4}$  W. westerly, which will lead in between the piers or moles in 28 feet at low water, but with extraordinary low tides a foot less. From abreast the outer end of the southern mole, the water will deepen by edging towards the northern mole; when within the small breakwater projecting northward from the W. angle of fort San Pietro, edge to the southward for the anchorage.

On the S. side of the harbor, about 400 yards to the NW. of San Pietro bastion, are two beacons, one being in the water, the other on the shore; and on the land W. of Rocchetta channel are two other beacons. These four beacons bear about NNE. and SSW. of each other, and in line, when bound to or from Rocchetta channel, clears the shoal ground bordering the western shore of fort Alberoni. The channel the whole way to the city is thence marked by clusters of piles, which serve to support the banks and preserve the channel, and presents no difficulty to a vessel well handled, except turning into San Marco channel, when great care is required, and the headsails should be ready for use. A small vessel of war may be permitted to make fast to a buoy off San Marco square, with the stream anchor astern to prevent swinging with the tide.

The channel up becomes much narrower after passing the town of Malamocca, but simple, it being only necessary to use caution in turning the vessel.

**Malamocco island** is about  $6\frac{1}{2}$  miles in length, extending from port Malamocca to port San Nicolo del Lido. The northern portion is the most elevated, between which and near Alberoni fort, at the SW. end, a sea-wall protects the island from the heavy sea occasioned by southerly and easterly winds. The steeples of Malamocco and Poveglia, at about

2½ and three miles from the southern end of the island, the forts at the extremities, the pilot station, and light-towers are the most conspicuous objects. Malamocco, like Pelestrina island, in separating the sea from the lagoons of Venice, serves as an effectual barrier to the canals against the violence of the sea.

**Cortellazzo Bank.**—This extensive bank of gravel and weeds runs in an ENE. and WNW. direction between port Malamocco and the town of Caorle at a distance of about seven to 12 miles from the coast. The bank is about a mile wide, extends 25 miles parallel to the shore, and has from 10 to 12 fathoms water on it; within the bank there are 13 fathoms, and without 13 and 15 fathoms, sand. It is said to afford some protection from the sea to the anchorages on the coast.

**Pelorosso Road.**—This anchorage is off the entrance of port Malamocco in from 6½ to 8½ fathoms mud, sand, and shells, at the distance of one to two miles from the light-tower on the N. mole. A fair summer berth for a large vessel will be found in about eight fathoms, with the mole-light bearing W. ¼ S., and Poveglia steeple a little open eastward of Malamocco steeple.

Pelorosso road is exposed to winds between NE. and SE.; it is not advisable to anchor here in a large vessel, excepting in fine weather, and to await high water for entering Malamocco; under other circumstances, it is better to proceed to Piave anchorage. Vessels should be quite prepared for a start when lying at this road, which may be more easy to leave than the other anchorages on the coast, when forced by bad weather to get under way.

**Port San Nicolo del Lido** is formed at the N. extreme of Malamocco island. It was formerly the chief port of the lagoons, but is now inaccessible at low water to vessels drawing more than about nine feet. A shallow bank leaves the shore to the N. of Malamocco island, and with an outward curve extends southward for about three miles, covering the entrance to the port. At the S. end of the bank, between it and Malamocco island, is a passage carrying eight and 10 feet water, leading round the N. end of the island into port San Nicolo del Lido. Thence the distance to Venice arsenal is about a mile and the water deep.

The depth in the port, along the shore of Malamocco facing fort San Nicolo, is six and seven fathoms, sandy bottom; it is customary after dropping the anchor to carry a cable to the shore southeastward. In bad weather it would be impracticable to enter this port, the surf then forming one long line of breakers. In such weather a vessel should proceed to Piave Vecchia anchorage or seek shelter under the shore of Istria. A local pilot is indispensable.

**Port St. Erasmo** is a narrow channel, the entrance to which is so

much obstructed by the sandbank of port San Nicolo del Lido, that it is only practicable for boats or vessels of very light draught in fine weather at high water. The entrance is three-quarters of a mile from fort San Nicolo. St. Erasmo island is well cultivated.

**Port Tre Porti** runs up in a northeasterly direction towards the channels and lagoons at its head, and leads directly to Burano, and from thence communicates by canals with Caorle and Venice, and other places in the interior. The passage is in between the shoals which obstruct the entrances to port San Nicolo del Lido and St. Erasmo on the W., and the shallow water projecting from the opposite shore; eight feet of water can be carried over the flats.

**Anchorage.**—Vessels may anchor in seven or eight fathoms, at about  $2\frac{1}{2}$  miles from the shore, anywhere along the coast between the entrance to Tre Porti and port Piave Vecchia. Small vessels come to, nearer the shore, in about four fathoms, sand, mud, and shells.

The best anchorage within the above mentioned extent is about eight miles eastward of the church of San Nicolo del Lido (the tower of which is 128 feet high, at the N. end of Malamocco island), and about  $2\frac{1}{2}$  miles from the shore; the depth is nine and eight fathoms, sand and mud. There is good shelter here in a bora from Piave point, but a vessel is exposed to easterly and southeasterly winds, which, however, need not be feared if the vessel has good ground tackle.

It is, however, advisable, if the weather should look threatening from eastward, to weigh and proceed for shelter under the coast of Istria. This is a good anchorage in northerly and in westerly winds, but bad in those from SE. and from SW., which send in a considerable swell, and in which Pelorosso anchorage should be preferred.

Vessels also anchor farther westward, with Burano steeple bearing about NNW.  $\frac{1}{4}$  W., and nearly in line with fort Tre Porti.

In approaching the anchorage from the northeastward in clear weather, after making the land eastward of Venice, a vessel should be guided by the tower of San Marco of Venice, and by Piave Vecchia light-house, the bearings of which will indicate a vessel's approach to the shore. The anchor may be dropped about midway between Piave and fort Tre Porti, but not in less than nine or eight fathoms.

**Port Piave Vecchia** is seven miles from Tre Porti. The coast between them consists of sandy hillocks; small boats have no difficulty in landing during fine weather. The port is a winding channel about 30 fathoms wide, and extending inland communicates with other channels. Vessels drawing seven feet can enter at high water; there is a depth of about four feet at low water. It is the old mouth of the Piave, and receives the waters of the river Sile, which has a depth of 10 feet



as far as Treviso, about 20 miles from the sea. Vessels anchor in any part of the channel, and secure to the shore against the freshets from the Sile. The Piave Vecchia rises at the foot of mount Paralba, and is navigable from the sea as far as the village of Noventa, about 14 miles.

The entrance to port Piave Vecchia will be recognized by the conspicuous light-house and by some houses on the port hand. A vessel should not approach too near the shore till the passage, which is quite safe, has been clearly made out. The light-house is also an electric telegraph station.

**LIGHT.**—On the W. point of the entrance to Piave Vecchia is a circular white tower, which exhibits, at a height of 146 feet above the level of the sea, a *fixed* white light of the second order, visible 18 miles. The light illuminates an arc of  $300^{\circ}$  between the bearings S.  $14^{\circ} 57'$  E. and S.  $74^{\circ} 57'$  E.

**Port Cortellazzo**, about eight miles eastward of Piave Vecchia, is formed by the waters of Piave river, and communicates with Caorle and the lagoons by various channels, navigated by vessels of about 20 tons burden. The entrance is obstructed by sand banks on either side; between them is a narrow and difficult passage, which runs N. and S., with a depth of only three feet at low water; at high water, when no leading marks can be distinguished, the difficulty is greatly increased.

The position of this port will be known by the light-house of Viave Vecchia, by Caorle steeple, and by the high land in the interior.

**The Anchorage** off the port is in a depth of about eight fathoms, mud and sand. Vessels generally anchor at two miles from the shore, between port Piave Vecchia and Caorle town.

**The Coast** between port Cortellazzo and the town of Caorle, eight miles farther on, consists of sand hillocks scarcely elevated above the level of the sea. Under favorable circumstances it may be approached by the lead, but in winter it is advisable to give it a wide berth, as easterly and southeasterly winds, which are of long duration, blow right upon it.

**Port Santa Margherita** is the mouth of the Livenza river, which is fed by the waters from the Friuli mountains, and communicates with Venice and Treviso. The entrance between the shoals on either side is about 200 yards, with a depth of little more than three feet at low water. The current of the river and strong southeasterly winds occasionally alter the form of the shoals. The small craft which visit this port anchor in from one to two fathoms, muddy bottom.

**Caorle.**—This town is on the sea-shore, about a mile northeastward from Sta. Margherita, and forms the only conspicuous object on this

part of the coast, though when near the shore two large buildings will be seen about two miles to the NE. of it. The steeple is 162 feet high, and visible at some distance. A stone embankment protects the shore abreast of the town from the sea, and on a projecting point to the NE. is the church of Madonna degli Angeli. Water and small supplies of provisions of all kinds are obtainable at Caorle. Population about 3,000.

**Grado Lagoons**, also called Marano lagoons, commence at Caorle; they resemble those of Venice, and embrace an extent from E. to W. of 30 miles; most of the 25 islands, the chief of which is Grado, have but few inhabitants.

**Port Falconera** is formed by the waters of the Lemene at the mouth of that river. It runs in for about  $1\frac{1}{2}$  miles, and carries from about eight feet at the entrance to an average of four fathoms within, but the bed of the river is uneven, and in places it is seven and eight fathoms deep. The port affords shelter for a large number of vessels, that can enter with all winds. It is convenient for loading and unloading, and the holding ground is good. The passage in is marked by stakes on either side, and there are two openings through them; one to the S. of the town of Caorle, with six feet water, the other about a mile to the NE. of Caorle, but though the latter is the deeper, the former is more frequently used.

The port communicates with Portogruaro, the Livenza, Caorle, Venice, and Treviso.

**The COAST** between port Falconera and port Baseleghe, three miles northeastward, is a low sandy shore, bordered by shoal water, at a distance of three-quarters of a mile, and parts of which are nearly dry at low tide. Vessels may anchor in about five fathoms; good holding ground at  $1\frac{1}{2}$  miles from the shore for temporary shelter from a westerly gale or from heavy northerly or northeasterly winds; but with on-shore winds this anchorage is not recommended.

The entrance to the small port of Baseleghe is barred by a sand bank, which at times is nearly awash, and is only accessible to boats in fine weather at high water. The steeple of Caorle will indicate the position of this place.

The coast between Baseleghe and the mouth of Tagliamento river,  $4\frac{1}{2}$  miles eastward, consists of low sandy hillocks; a few scattered trees alone break the uniformity of the view. Between Tagliamento river and Lignano,  $3\frac{1}{2}$  miles to the NE., the coast is very low and bordered by shoals, which render access difficult even to boats. Vessels sometimes anchor temporarily about two miles from the shore, in  $5\frac{1}{2}$  fathoms, clay bottom.

The Tagliamento river communicates with Latisana nine miles northward of its mouth, and is navigable by boats for about 13 miles. The entrance, between two shifting sandbanks, is only a few fathoms wide, and is nearly dry at low water. The position may be recognized by Caorle and Marano steeples, and by its low projecting point.

**PORT LIGNANO** is formed at the entrance of the river Stella; it runs in upwards of a mile with an average breadth of about a third of a mile, and being from 20 to 25 feet deep, with a little under 10 feet in the channel at the entrance, renders it the best and the most useful of the ports on the Friuli coast. It communicates by channels with Marano and Muzzana, and by the Stella with Palazzolo. The best berth is off the mouth of Marano channel, where vessels moor with open hawse to the southward, and are well sheltered.

The entrance to the port is fronted by an extensive shallow bank which extends southward fully  $1\frac{1}{2}$  miles from the custom-house; the bank is broken, leaving passages for small vessels. Vessels unable to stem the ebb-tide, which after heavy rains is very rapid, usually anchor at the entrance, opposite the buildings and old battery on the left hand, but the anchorage here is exposed to sea-winds.

The port will be recognized by a large tree at Pineda, to the left of the entrance, by the custom-house at Lignano on the W. side of entrance, by that of St. Andrea, and the low tower of Marano; the deeply notched outline of the Friuli mountains will be seen in the background.

The low coast in the neighborhood of Lignano should be cautiously approached, and not within the distance of  $1\frac{1}{2}$  miles until the entrance is made out; for entering the port local knowledge is required.

It would be imprudent to attempt to beat into Lignano against a fresh breeze and ebb-tide; a vessel should then anchor about two miles from the entrance, in a depth of  $5\frac{1}{2}$  fathoms, good holding ground, with Morano steeple bearing about N.  $\frac{1}{2}$  W., and Tagliamento point SW. by W.  $\frac{1}{2}$  W.

**Coast.**—The small harbor of St. Andrea is about a mile eastward of the entrance to Lignano, from which it is separated by an extensive shallow bank. About six feet water can be carried through the entrance.

The shore between St. Andrea and port Buso, nearly three miles to the eastward, consists chiefly of sandy hillocks; it is low, and shoal water extends off a long distance. Between Tagliamento point and port Grado the shore forms a bay nearly four miles deep; around the bay  $5\frac{1}{2}$  fathoms water will be found two miles from the shore.

## CHAPTER VII.

### PORT BUSO TO MERLERA POINT.

VARIATION IN 1883.

Port Buso,  $10^{\circ} 44'$  W.

Merlera point,  $10^{\circ} 29'$  W.

The eastern coast of the Adriatic sea, from port Buso at the boundary between Italy and Austria to cape Linguetta, embraces an extent of about 500 miles. The portion included in the following chapter is between port Buso and Merlera point, on the S. coast of Istria.

**COAST.**—The shore from port Buso eastward to Trieste is called the Friuli coast, and forms the head of the gulf of Trieste; its aspect, which on the W. is low and sandy, changes completely at Duino, becoming high and precipitous. From port Buso the shore trends ESE. six miles, nearly to the town of Grado, and then eastward and northerly  $8\frac{1}{2}$  miles farther to Sdobba point; it is all along very low and broken, and the only remarkable object is Grado steeple. Sand banks and shoal water, which border the coast, reach off in places a considerable distance and render approach difficult even to small boats.

The most dangerous bank is the Mula di Muggia, eastward of Grado, which extends southward  $1\frac{1}{2}$  miles, and dries at low water, leaving between its NE. end and the shore bank a passage into a small area called port Primero. The five-fathom line of soundings curves along the low shore at a distance of from two to three miles.

A bell-buoy marks the southern end of this bank, placed in six fathoms of water on the following bearings:

Grado church tower.....	N. $47^{\circ} 12'$ W.
Duino Castle .....	N. $41^{\circ} 48'$ E.
Salvore light-house.....	S. $14^{\circ} 12'$ E.

**Port Buso.**—This port communicates with all the lakes and receives the waters of the Anfora, Ausa, and Indermur rivers. The passage to it between the banks has only a depth of about six feet, and four fathoms water within; the banks extend more than a mile from the shore, where there are only six feet of water. Boats ascend the Ausa river as far as Cervignano village, a distance of about 10 miles. The entrance is indicated by Marano steeple to the NW. and that of Grado to the SE.

**LIGHT.**—On the outer end of the pier at port Buso is exhibited a light visible three miles in clear weather, which is *white* from N.  $50^{\circ}$

51' W. to N.  $23^{\circ} 50'$  W., *red* from N.  $23^{\circ} 50'$  W. to N.  $43^{\circ} 10'$  E., and *white* from N.  $43^{\circ} 10'$  E. to S.  $10^{\circ} 50'$  E.

**Port Grado** communicates by water with Buso, Marano, and Aquilea; it is formed by openings in the banks and by the waters of the lagoons which surround the village of Grado. The banks fronting the port extend off upwards of a mile, and a passage through them with four feet water leads in to a depth of five fathoms, mud and clay bottom. The banks are affected by the freshets from the lagoons, and by strong winds from seaward.

The population of Grado is about 3,000, mainly engaged in the tunny fishery. A telegraphic cable runs between Grado, Belvedere, and Cittanuova, on the coast of Istria.

**Lights.**—Three *fixed* white harbor lights are shown from lamp-posts, for the purpose of indicating and leading into port Grado; they are elevated 16 feet above the sea, and should be seen from a distance of two miles. One of these lights is on the head of the embankment on the left side of entrance to the port, a second is placed upon the mole inside; these two lights, when in line, correspond with the direction of the channel; a third light is on the edge of the inner basin.

**Port Primero** is about  $3\frac{1}{2}$  miles eastward of Grado; the entrance to it is through shallow openings in the banks, but within the water is deeper, being  $2\frac{1}{2}$  fathoms; the place is surrounded by sand banks. The objects for recognizing port Primero are the Grado steeple, and the custom-house to the right of the entrance.

*Leading lights at Grado and at Port Primero.*

For the purpose of marking Mula di Muggia bank, two *fixed white* lights, placed vertically, have been established at Grado and at Porto Primero.

The lights at Grado, facing E. by S., are exhibited from two windows of a small square masonry tower situated near the beach, in the vicinity of fort Palazzetto.

These lights illuminate an arc of  $53^{\circ}$  between the bearings N.  $40^{\circ} 43'$  W. and S.  $86^{\circ} 17'$  W.

The lights at Porto Primero are shown from two windows of a similar tower, situated on the beach NE. by N. of Porto Primero, and  $1\frac{2}{3}$  miles SW. by S. of Golometto, and illuminate an arc of  $37^{\circ}$  between the bearings N.  $23^{\circ} 17'$  E. and N.  $60^{\circ} 17'$  E.

The arcs of illumination of the lights either at Grado or Porto Primero are so arranged, that a vessel sighting either pair of lights is clear of the bank; should, however, the second pair of lights also come in sight, making the four lights visible at the same time, it will indicate

that the vessel is near the bank and must shape such a course as will cause her to lose sight of one or both pairs of lights.

**Sdobba Point.**—At  $3\frac{1}{2}$  miles eastward of the custom-house at port Primero, and immediately westward of Sdobba point, are the mouths of Isonzo and Isonzaŕo rivers, called port Sdobba, and which communicates by water with Primero. Its entrance has less than three feet water, and like the coast all along is encumbered with sand banks, which by frequent changes alter the depth and breadth of the passage.

The position of Sdobba point is easily recognized, being the easternmost extreme of this part of the coast; Aquilea steeple will be seen northwestward, and the village of monte Falcone, or Monfalcone, on an eminence to the northward. Fine weather is required for entering port Sdobba, as the approach is dangerous when there is the least break on the shoals.

**Panzano Bay**, or Sacca di Panzano, is about three miles deep, from a line between Sdobba point and Duino; it has depths of from two to  $5\frac{1}{2}$  fathoms, mud bottom. Sdobba point is low, projects a long way to the eastward, and is surrounded by shoal water which extends off nearly a mile. The shore on the W. side of Panzano bay is low, and rendered inaccessible by sand banks and shallow water; several streams run into it. There is anchorage in five or  $5\frac{1}{2}$  fathoms, mud, in the central part of the bay.

**Port Duino.**—The village and castle of Duino stand upon a rocky eminence, at the foot of which is the port, a creek protected by a small mole; the depth at the entrance is 15 feet, and about three feet, muddy bottom, within. Southwesterly winds cause a swell inside.

**Timavo River.**—The mouth of this river is under a steep rocky eminence, on the summit of which is Duino castle. It is well sheltered from all but southerly and southwesterly winds, which raise a considerable swell. It is through this river that Venice and the whole of Friuli are largely supplied with grain exported from Trieste.

Timavo river flows into the sea about three miles NNE. of Sdobba point, and through an extensive sand bank, which shifts by the currents. The entrance is between this bank and the shore, the channel running SE. and NW., parallel with the latter. The depth at the outer part is three feet, but it increases within to nine feet, sand and mud. The position of the entrance is easily recognized, being opposite a walled inclosure upon a hill a small distance inland, and about half a mile NW. of Duino village.

A small *fixed* white light, visible about three miles, marks the entrance at night.

At  $1\frac{1}{2}$  miles to the NW. of the mouth of the Timavo is a little channel between two piers, with four feet water, called port Rosega.

**The COAST** between Duino and Trieste, an extent of about nine miles, forming the head of the gulf of Trieste, presents an elevated and almost inaccessible shore, where in three small bays there is anchorage for coasters, but no place of refuge for larger vessels. It may be safely approached, as at the distance of 200 yards the depth is five to six fathoms, soft mud. Upon eminences near the sea are Duino, Santa Croce, and Opchina villages.

The three small bays alluded to are those of Duino, Sistiana, and Grignano. Sistiana, which is exposed to westerly and southwesterly winds, has a depth of about seven feet, but the holding ground is bad. Grignano, about five miles southeastward of Sistiana, is exposed to westerly and southwesterly winds. There is a small mole here.

Water may be obtained at springs, in the two latter bays.

**LIGHT.**—At Barcola, about a mile northward of the N. end of the breakwater of the new port at Trieste, is a small mole from the head of which is shown a *fixed red* light, visible two miles; but the light cannot be exhibited during strong NE. winds.

**The GULF of TRIESTE**, the NE. portion or head of the Adriatic, is comprised between Tagliamento point on the NW. and Salvore point on the SE., which are about 18 miles apart. From this limit the gulf is nearly 20 miles deep, and at its head, or eastern extreme, is the city of Trieste. The bottom throughout is of mud and clay, rendering it often difficult to weigh the anchor, the depth in no part exceeding 13 fathoms.

In steering for Trieste, vessels should endeavor to make the coast of Istria about Rovigno, the high steeple of which may be seen at a great distance. The long flat on the N. side of the gulf near Grado village should not be approached within a depth of six fathoms.

**TRIESTE.**—This town is situated on an acclivity at the foot of a range of hills and mountains; mount Opchina on the N. being 1,362 feet high; mount Cal on the E., 1,462 feet; and mount Bello to the SE., about 908 feet above the sea; beyond which rises the Julian Alps, with its pass reaching 1,800 feet, and its summit 4,000 feet, above the sea. The slopes of the hills are covered with white villas, the residences of wealthy merchants, and which, being scattered in every direction, present a picturesque appearance from the sea.

The unfavorable and rocky nature of the limestone soil in the neighborhood of Trieste and in Istria, where a large portion of the soil is sandstone, and the want of water, which in dry seasons become serious, render cultivation of the land far from profitable. It is best adapted

for the growth of vines and olives, and the population derive their chief means of subsistence from the produce of the former.

The only industrial enterprises deserving of notice, or which afford employment to any considerable extent, are the ship-building yards and workshops of the Austro-Hungarian Lloyd's company, and of Messrs. Strudthoff & Co., at S. Rocco; the foundery and engine factory "Stabilimento Tecnico Triestino," belonging to the last-named company, and one established and carried on by an Englishman, Mr. Thomas Holt; two flour mills, a chocolate manufactory, and a brewery.

Consuls and agents for all the great powers, or for more than 30 different states reside in Trieste. An excellent tribunal of commerce exists, and a school of navigation, to which an observatory is attached.

On Grignano point, about  $3\frac{1}{2}$  miles to the NE. of Trieste, is a magnificent villa, or castle, named *Miramar*, a conspicuous object from all parts of the bay. The electric telegraph connects Trieste with all the capitals in Europe, also with Cattaro. A railroad is carried over the Julian and Scemmering Alps, at a summit level of 2,893 feet above the sea.

The commerce of Trieste owes much to the establishment of the Austrian Lloyd's steamers, upwards of 80 in number, which communicate regularly with all the principal ports of the Levant. The arsenal for the repair of their vessels, S. of the town and about half a mile SE. of St. Andrea point, is about 25 acres in extent, and contains a dry dock 300 feet long, having 25 feet water over the entrance sill, shut by a caisson; also, parallel to it, a patent slip, 700 feet long, capable of taking up a vessel of 2,000 tons; the outer end can be closed by a caisson, and the water pumped out, so as to take in two or three vessels at once. The S. face of the arsenal is lined with quays, alongside which steamers can lie, and there are three cranes, worked by steam, capable of lifting 60 tons each.

In the factory is a steam hammer and every requisite for the repair of boilers; 2,000 men are said to be employed on the works. It appears to be a well-regulated and efficient establishment. At what is termed the Technical establishment, just to the westward of the arsenal, are a steam factory and foundry, where the largest engines are made, and the means of casting a weight of 15 tons. The establishment is said to employ 1,500 men.

The population of the town and suburbs is about 109,000.

In the year 1875, 3,321 vessels, with a tonnage of 791,435, entered the port; the value of the imports being 13,776,764*l.*, and 3,078 vessels, with a tonnage of 811,418 cleared, the value of the exports being 10,244,246*l.*

**Port of Trieste**, which is of semicircular form, has sufficient space



for a number of vessels of any size. It is sheltered from all winds from the eastward, but exposed to those from the westward; Santo Teresa mole, which extends northerly from St. Andrea point, protects it from southwesterly winds. The depth at the entrance of the mole is about eight fathoms, soft mud, but within the water is shoal. The southeastern portion is entirely bordered by stone quays, with five projecting moles or jetties. To the southward of St. Carlo mole on the N. is a small wet dock, called the *Mandracchio*, near which is the health office, and to the northward of the mole is the entrance to the basin, which is 20 yards wide, 12 feet deep, and extends in a SE. direction into the quarter of the new town called Theresien-stadt, by means of which vessels can be conveniently unloaded.

At the northern extremity of the town is the railway station, and farther N. the lazaretto, one of the largest and best arranged in Europe. The building contains accommodation for 200 persons, and is surrounded by a wall 24 feet high. The new port is formed by a substantial quay with four broad projecting piers in front of the above buildings, and sheltered by a breakwater upwards of 1,000 yards in length, with the space between about 400 yards wide and nearly half that distance between the piers and breakwater, the depth of water within the breakwater being from five to nine fathoms.

Inside of Santa Teresa mole, which is the old harbor of Trieste, there is sufficient space for several vessels.

Shoal water borders the shore of St. Andrea point and along the sea face of Santa Teresa mole, which is marked by four white beacon buoys placed in  $3\frac{1}{2}$  fathoms water.

The bora reaches Trieste with great violence from the high lands in the vicinity, especially in the winter season; in the summer, westerly winds, which send in a heavy swell, are the most inconvenient, but they never last long. In strong southerly winds the water at times rises sufficiently to inundate parts of the town.

**Supplies.**—An aqueduct formed on the slope of mount Santa Croce, six miles to the northward, brings into the town by means of pipes laid along the railway, abundance of fresh water, which is carried down to the marina. It is pumped up 400 feet by a steam engine. All kinds of refreshments and means of refitting vessels are cheap, and of good quality.

The facilities for coaling, considering the commerce of the port, are very bad. Styrian and Dalmatian coal is generally used by steamers. Usual cost 24 shillings per ton; quality poor; quantity abundant. A limited supply of Cardiff coal can generally be obtained.

**LIGHTS.**—At the extremity of Santa Teresa mole is a round gray

tower which exhibits, at 110 feet above the sea, a white light showing a *flash* every *half minute*, and visible from a distance of 16 miles.

A steam trumpet in thick or foggy weather will sound *two blasts* of *six seconds* duration, followed by an interval of *fifteen* seconds.

Three lights triangular, the upper *red*, the other two white, shown from an iron post on San Carlo mole, are visible two miles.

Two lights, one white, the other green and to seaward of the former, shown from Giuseppino mole, are visible two miles.

On the N. end of the breakwater of the new port are two *vertical green* lights, visible two miles, and on the S. end of the breakwater are two *vertical red* lights, visible two miles.

In order further to mark the northern entrance of the new port, two lights are shown from mole head No. 1, one at each angle.

The lights are fixed *green* lights, showing a sector of white light over the bay through an arc of  $60^{\circ}$ , and are elevated 16 feet above the sea.

A fixed *red* light (masked towards the breakwater), elevated 10 feet above the sea, is shown from the extremity of the transverse arm of the breakwater.

**Time Ball.**—A black ball three feet in diameter is hoisted daily, five minutes before noon, Trieste Mean Time, at the NW. side of the light-house, 56 feet above high water. At the instant of mean noon (or 55m. 1. 8s. before Greenwich mean noon) the ball is dropped, and a gun fired. Should the signal fail in accuracy, the ball is hoisted half way, and kept so for some time.

**Tides.**—It is high water, full and change, at Trieste, at 9h. 35m. ; and the rise about two feet.

**Anchorage.**—In approaching Trieste, care should be taken to avoid fouling any of the numerous mooring buoys placed for securing vessels during the winter months. These moorings lie between Santa Teresa mole light-house and the breakwater of the new port, and though generally small vessels only make fast to them, the anchors are very heavy; Santa Teresa mole light kept eastward of a S. by E.  $\frac{1}{2}$  E. bearing clears them. Large vessels should moor outside this bearing in about 10 fathoms water, with the S. end of the breakwater about E.  $\frac{1}{2}$  N.

**COAST.**—The W. coast of Istria commences southward of Trieste and terminates at cape Promontore, an extent of about 65 miles, forming numerous indentations, among which are some excellent ports, the largest being between Trieste and Salvore point; the safest are southward of the latter; every village may be said to have its little port. The shore between the two points is bordered by numerous rocks and shoals which in places extend as far out as three miles. The soundings near the land vary greatly; between Salvore point and Rovigno,

there is a depth of about 13 fathoms, muddy bottom, outside the rocks; near the shore between Rovigno and cape Promontore, there is frequently a depth of 20 fathoms, mud, close to the shore.

Istria is a mountainous peninsula. It produces oil, wine, wheat, honey, beeswax, silk, hides, tallow, building-timber and salt, and possesses marble and freestone quarries. The climate is considered unwholesome; the inhabitants, about 200,000, are of Slavonic origin, and their chief occupation is agriculture.

**Anchorage.**—There is anchorage all along the coast of Istria, but regard must be had to the direction of the prevailing winds. Generally, a vessel may safely anchor during northeasterly and southeasterly winds, within a zone of three to 10 miles from the land, in good holding ground. With bora winds a vessel should never, if avoidable, anchor between Trieste and Salvore point, and it is not safe to bring-to anywhere with on-shore winds, unless there be every indication of fine weather; and then preparation should be made for leaving at any moment.

**MUGGIA BAY** is formed between St Andrea and Sottile points, which are nearly  $2\frac{1}{2}$  miles apart; the bay is open to northwesterly winds, which send in a considerable sea, but it affords good shelter inside for small craft in the bora and in easterly winds. There is a depth of eight fathoms, muddy bottom, half a mile from the shore, with the steeple of Servola village bearing NE. A sailing vessel seeking this anchorage in a bora gale should in passing St. Andrea point, on the port tack, take care to avoid the shoal water, which extends 300 yards from it; vessels should leave the bay when the gale is over.

With winds from seaward a vessel will find good shelter in about eight fathoms, abreast of the small village of Muggia, on the S. side of the bay. Coasting vessels moor within a small mole at the village. There are no hidden dangers in Muggia bay.

Water may be frequently obtained with facility from two streams at the head of the bay: there is a small run at the village, but in summer it is generally dry.

**LIGHT.**—A small *fixed red* light, visible about two miles, is shown from the mole head at Muggia.

**Sottile Point.**—At the termination of the land between Muggia and Capo d'Istria bays is an indentation about half a mile deep, with six to eight fathoms water, soft mud, formed by Sottile and Grossa points. The shore of this little bay is protected by high land, under shelter of which vessels of light draught anchor during bora and SE. gales. Both points are bordered by shoals with four to six feet water, which extend off about 500 yards. The shallow water off Sottile point, the

N. extreme of the bay, is marked by a bell buoy, surmounted by a cage. The shoal extending from Grossa point, the S. extreme of the bay, is marked by a white beacon buoy, in  $4\frac{1}{2}$  fathoms.

**LIGHT.**—On Sottile point is a circular white tower, which exhibits at 142 feet above the sea, a revolving light flashing each minute, visible 18 miles.

**Measured Mile.**—Two beacons are erected on Sottile point, and two on Grossa point, for the purpose of indicating the length of a measured mile. The line of direction is N.  $43^{\circ}$  E. or S.  $43^{\circ}$  W. *true*.

**CAPO D'ISTRIA BAY**, between Grossa and Ronco points, is open to the westward; these points are about  $4\frac{1}{2}$  miles apart, and the depth of water within is 10 and 11 fathoms, all over the bay, except at the head; and in Stagnon and Campi bays, where the water is shoal, and the bottom soft yellow mud. The bay is bordered by high lands, the highest peaks of which form mount Trajan.

The usual anchorage is in 10 fathoms, mud, at about  $1\frac{1}{2}$  miles north-westward of the town, sheltered from off-shore winds, but exposed to westerly winds, which occasion a heavy and sometimes dangerous sea.

The holding ground is not good.

The town of Capo d'Istria has an imposing appearance from seaward. It stands on a rocky islet at a short distance from the shore, and communicates with the main by a stone causeway. It is the chief city of the Istrian peninsula, and has a population of about 8,000, but is of less importance than formerly, owing to the proximity of Trieste, and to the absence of a safe port. It was once the capital of Venetian Istria and has numerous churches, a gymnasium and a prison. The air is wholesome, notwithstanding the close vicinity of numerous salt-ponds. A little mole and coves under the town afford shelter to small coasters and fishing boats, which also seek refuge from a gale in Stagnon bay, eastward of the town, between it and the mouth of the rivulet Risano.

An aqueduct leads a good supply of water to the seaside; provisions of all kinds are obtainable. The only other resources are those suitable to the construction and refitting of small native craft.

**LIGHT.**—On the extremity of the mole at the town of Capo d'Istria, a small *green* light is shown, visible about two miles.

**Isola.**—This is a small rocky projection with a village on it joined to the main by a narrow low strip of land. A small dock or cove, protected by a mole, has sufficient space to shelter about 100 fishing boats. Vessels may anchor abreast of Isola in about nine fathoms, muddy bottom, at half a mile westward of the village.

Water in abundance may be obtained from a spring to the southward of Isola.

**LIGHT.**—A light is exhibited from a staff 17 feet high, placed about nine yards from the water on *Punta del Gollo*, *San Pietro* island, in the port of Isola.

The light is *fixed white* and *red*, showing *white* between the bearings S. 45° W. and S. 45° E., over an arc of 90°, and *red* between S. 45° E. and N. 45° W., over an arc of 180°.

**Ronco Point**, which forms the S. extreme of Capo d'Istria bay, is an elevated cliffy point of brownish color. Like the whole of the coast, as far as Madonna point, upon which is the town of Pirano, it is of bold approach.

**PIRANO BAY**, although unprotected from the bora, affords the best anchorage on the coast of Istria for vessels unable to reach Trieste, or which, being driven by strong winds from that port, are obliged to bear-up for shelter. The bay is surrounded by high land, and large vessels may anchor anywhere in seven to nine fathoms, soft mud, but the holding ground is bad, which renders this place dangerous in a bora gale. With this wind, the anchorage under mount Mogarone, three-quarters of a mile southward of Madonna point, is less insecure; here there is a depth of eight or nine fathoms, mud, between the town and port Rose, but no vessel should, if avoidable, remain during a bora gale, as in the event of being driven from her anchors she would be unable to gain an offing, and would have the iron bound coast, terminating by Salvore point, under her lee.

Northerly and northwesterly winds, to which Pirano bay is open, are seldom strong enough to cause a vessel to drive, and at the worst she would be forced upon the mud at the head of the bay. Westerly winds send in a considerable but not a dangerous sea.

The port of Pirano is a small inlet well protected westward by a mole; it has a depth of two fathoms, and around it is the town, which contains about 3,600 inhabitants, who share with Rovigno nearly the whole commerce of this coast. The steeple of St. Giorgio; being 236 feet above the sea, may be seen at a great distance. On the shore at the head of the bay are several salt ponds, from which considerable profit is derived. Water and provisions in abundance, may be obtained.

**Port Rose.**—This small port under mount Mogarone, southward of Pirano, affords shelter to small craft. The convent of St. Bernardino, on the left of the entrance, points out its position.

**LIGHTS.**—On Madonna point is an octagonal gray tower, from which is exhibited at 33 feet above the sea a *fixed red* light, visible in clear weather at a distance of 11 miles.

At Pirano new mole head is a *green* light, visible two miles; also, on the head of two small moles, *red* lights are shown seaward, and white towards the port.

On St. Bernardino point, port Rose, a *fixed green* light is also shown, visible six miles.

**SALVORE POINT** is the western extremity of the Istrian peninsula, and presents a front of about  $1\frac{1}{4}$  miles in extent to the NW. It is low, of dark appearance, and dangerous in foggy weather, although there is a depth of 11 fathoms at about 600 yards from it. Vessels at times lie almost in a calm under the land of Salvore, when the heaviest bora gale is blowing in the gulf of Trieste.

An electric telegraph station is established near the light-house, with which vessels can communicate by the international code of signals.

**Dangers.**—There are several rocky heads lying off the frontage of Salvore, at a distance of from half a mile to a mile from the shore, which should be avoided, especially in vessels of heavy draught.

The For shoal, the outer danger, with  $4\frac{1}{2}$  fathoms water on it, lies with the light-house of Salvore bearing SE.  $\frac{1}{2}$  S. nearly, distant  $1\frac{1}{10}$  miles, and the N. extreme of Salvore point E.

Gobbo (Humpback), a rocky shoal with 21 feet over it, lies half a mile from the shore with the light-house of Salvore S. by E.  $\frac{1}{2}$  E., easterly, about three-quarters of a mile distant, and the N. extreme of Salvore point E. by N., northerly.

The Or shoal, with 33 feet on it, lies to the southward and westward of the latter shoal, with the light-house ESE. nearly, distant 1,300 yards.

The Skar, a shoal with 23 feet on it, and the southernmost of these dangers, is about 400 yards in length, and from its N. end the light-house bears NE.  $\frac{1}{4}$  E. distant one mile nearly. The bottom in the vicinity of Salvore light-house is uneven and the soundings irregular.

**LIGHT.**—On the low SW. extreme of the land forming Salvore point is a white circular tower with a green lantern, which exhibits at 119 feet above the sea a *fixed* white light varied by a *flash* every minute, and which may be seen at the distance of 17 miles. As this light is perceived from Grado in clear weather, it is useful to the navigation of the whole of the gulf of Trieste.

A *steam trumpet*, in thick or foggy weather, will sound a blast of *ten seconds* duration, with an interval of *thirty seconds* between each blast. In calm weather the blasts are said to be heard from a distance of 10 miles.

**Scipar Shoal.**—The coast from Salvore light-house to Umago,  $3\frac{1}{2}$  miles to the southward, is of little elevation; it forms several bays, with depths of two to  $3\frac{1}{2}$  fathoms, and in which coasting vessels seek temporary refuge from the bora.

Scipar shoal is a rocky bank, parts of which are at times uncovered, about  $1\frac{1}{2}$  miles southeastward of Salvore light-house, and extending a long half mile from the shore; it lies abreast of a small church, and a few houses near the beach, and its extremity is marked by a red conical buoy with skeleton ball, which lies in 10 feet, westward of the old Scipar castle.

**Umago.**—This port is a small semi-circular bay, open to the westward, the entrance to which is reduced to a breadth of about 150 yards by rocks, which extend towards each other from the extremes of the port. The village, containing about 650 inhabitants, stands on the S. side of entrance, and from it a mole projects 400 yards to the northward, on which is a red light-house.

About eight feet of water can be carried through the entrance, which increases inside at the anchorage, where there are about  $2\frac{1}{2}$  fathoms, mud and sand, with the church steeple, which is 109 feet above the sea, bearing about S.  $\frac{1}{4}$  E., and the light-house W. by S.

On the N. side of entrance to the port is a beacon having a stone foundation and wooden superstructure. It stands in about six feet water, about 150 yards within the S. extreme of the shoal, and vessels entering the port should pass between the beacon and light-house on the mole head, but near the latter.

This anchorage is preferred to that of Pirano by a small craft bound to Venice, as it is better sheltered from the bora.

There is also temporary anchorage about half a mile to the SW. of the light-house, in about 10 fathoms water. The village will be readily seen at some distance. Vessels from the northward should not approach too closely Pegolotta point, from which a reef extends off a quarter of a mile, with shallow water nearly the same distance beyond it; the extremity of the reef is also marked by a stone beacon.

**LIGHT.**—From the extremity of Umago mole is exhibited, at 29 feet above the sea, a *fixed green* light, visible through an arc of about  $315^\circ$  between the bearings of N. and NW. from a distance of five miles.

**Port Daila.**—The coast from Omago to port Quietto, eight miles southward, is clear of outlying danger, with eight and ten fathoms water, at a distance of about 800 yards; it is low, and forms several small bays.

Port Daila, the principal of these bays, affords shelter to coasting vessels from easterly winds, in about four fathoms, muddy bottom. A rocky bank, parts of which uncover with the tide, extends in a NW. direction about 700 yards from the S. point, and is marked by a white cone buoy with skeleton ball. The buoy lies in 16 feet of water, and small craft under eight feet draught can pass inside it; outside the depth

increases rapidly. A castle and some houses indicate the position of Daila, which is about  $4\frac{1}{2}$  miles from Umago. A stranger entering this bay should keep westward of the buoy of the S. side of entrance and in eight or nine fathoms water, and steer in nearly midway between the N. and S. points, with the Sanita, on a rock point at the head of the bay, bearing E. by S.

**CITTANUOVA.**—The town of this name stands on a projecting point, which separates the ports of Cittanuova and Quietto; it contains about 1,000 inhabitants, many of whom are fishermen.

The port of Cittanuova is open to the westward, and, being bordered by shoal water, has but a small space of about 600 yards in length by one in breadth, with a depth of three to five fathoms, soft mud. It is sheltered from the SW. quarter by the Val shoal, which lies off the entrance. Piles are driven into the shore, to which vessels secure their cables during bora winds.

**Val Shoal**, within a depth of five fathoms, is nearly 800 yards in length NW. and SE. with about  $1\frac{1}{2}$  fathoms water on its central part, which lies nearly 1,100 yards WSW.  $\frac{1}{2}$  W. of the battery at Cittanuova town, and is marked by a white bell buoy, in 12 feet water. Between the shoal and the town there is a passage with a depth of  $5\frac{1}{2}$  fathoms, mud and shells, in the center. The light on Dente point on the S. side of entrance is obscured in the direction of the shoal.

In approaching the port, the N. extreme of the town should not be brought to the northward of E. by N., and a course should be steered midway between the N. point of entrance and the town, as both shores must be avoided, being bordered by shoal water.

**Porto Quietto** derives its name from the small river Quietto, which has its source in the interior of Istria, traverses Montona forest, celebrated for its curved or knee timber, and empties into this bay. Port Quietto is open to the westward, with depths of 12 to 13 fathoms at the entrance, to five fathoms at half a mile from its head, soft mud; the soundings decrease gradually towards the eastern shore, which is composed of marshy grounds communicating with the mouth of the river.

Port Quietto affords good anchorage for vessels of any size, being sheltered from all but westerly winds; these send in a considerable sea, which, however, is never dangerous, and a vessel parting from her anchors would be driven on soft mud at the head of the bay. The bora never blows as hard here as at Pirano, and its direction is not such as to prevent egress, if it should be desirable to leave. The best berth is in the middle of the bay, in eight to 10 fathoms, or off Dente bay, in about 10 fathoms, a quarter of a mile from the shore.

The head of the narrow Torre creek, with a depth of 10 feet in the E.



extreme of the bay, affords security to small craft, which anchor and make fast to the shore.

At Quieto, the Venetian vessels of war formerly landed or shipped their guns and heavy stores when the weather did not permit them to lie safely at Pelorosso. Ship-building timber is brought here from the woods of Trieste and Venice.

**Supplies.**—Excellent water may be obtained in abundance at a spring close to the sea, half way between Bernazza point and the head of Torre creek. Oil, wine, firewood, and other small supplies may be obtained from Cittanuova.

**LIGHT.**—On Dente point is a light-house, which exhibits, at 36 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 11 miles. The light is obscured in the direction of the Val shoal between the bearings of SE.  $\frac{1}{2}$  S. and SE. by E., which clears the shoal on either side, and eastward of a line S. by W. from the light-house.

**Directions.**—On approaching port Quieto from the southward, the shore should be avoided, and the light-house on Dente point kept eastward of a N. by E.  $\frac{1}{2}$  E. bearing, in order to clear Civran shoal, which lies southward of the light-house and off the S. side of port Cervera; and on approaching from the northward, the N. extreme of Cittanuova should not be brought northward of E. by N. until Dente light-house bears SE. by E., so as to avoid Val shoal. The position of port Quieto may be easily known by Buë village, which stands on an isolated eminence, about nine miles inland.

**Port Cervera**, between Dente and Saltarel points, the latter  $1\frac{4}{5}$  miles to the southward, is about three-quarters of a mile deep, with nine and  $7\frac{1}{2}$  fathoms water, soft mud, at its head, where there is anchorage for small vessels, sheltered from all but northwesterly winds. The SW. side of the entrance is obstructed by shallow rocky ground, which protects it from that quarter. In entering the port, the S. point should have a wide berth, and the northern shore kept abroad. The village is on a rather elevated spot on the S. side, and near it is a small stream.

**Civran Shoal.**—The shallow rocky ground in front of Saltarel point, on the S. side of entrance to port Cervera, extends 1,200 yards to the NW. of the point, and then trends nearly a mile in a SW. direction at the distance of about 1,600 yards from the shore. It is divided into two parts, the northern portion is called the Erbe shoal, and has a rock on it which uncovers two feet; the southern and larger portion is the Civran shoal, and has also a rock above water in the middle of it, at about half a mile westward of the point. In order to clear the shoal, a vessel should keep well outside or westward of a line joining Castagneda point

N. of Cittanuova, and St. Nicolo islet of Parenzo; and Dente point light-house should be eastward of a N. by E.  $\frac{1}{2}$  E. bearing.

To the southward of Civran shoal the coast is low and forms one or two little bays, with depths of two to three fathoms, sandy bottom.

A *white* buoy, with staff, is moored in  $3\frac{1}{2}$  fathoms on the outer edge of Civran shoal, between Parenzo and Cittanuova.

**Maturago Shoal**, with  $1\frac{1}{2}$  fathoms on it, and deep water close to, lies nearly 1,200 yards from the point of the same name, and  $1\frac{2}{3}$  miles N.  $\frac{3}{4}$  W. of the tower on St. Nicolo islet. To avoid this danger, keep the tower eastward of S. by E.

**Parenzo.**—This small ancient town, containing about 2,000 inhabitants, stands on a low tongue of land about  $4\frac{1}{2}$  miles southward of Quieto; it has a large church, a basilica of the time of Justinian (A. D. 540), and of course one of the oldest Christian churches existing, and an old convent, near which is a conspicuous round tower. The town is scantily supplied with water by cisterns and wells. Wine and salt fish can be obtained.

The port of Parenzo is formed between the town and Barbaran islet on the NE., and by the islet of St. Nicolo, Calbula, and Sarafel, which are connected to each other and to the shore by shallow water on the SW., the whole extending to the NW. nearly three-quarters of a mile. Its area is a short half mile in length, and about 400 yards in breadth, with from five to two fathoms water, hard mud, good holding ground.

This port is considered the best shelter in bad weather on the coast of Istria, for vessels drawing not more than 15 feet, but for larger vessels is only safe with land winds.

**St. Nicolo Islet.**—This islet, which is 80 feet high and about a third of a mile in length, is united by shallow water to the low islet of Calbula on the NW. and with Sarafel islet on the SE., the former at about 100 and the latter 200 yards distant. Quarantine is performed on the islet; it is planted with olive trees, and on it is a convent and an ancient tower. Beccaria shoal, with one fathom water on it, lies 500 yards from the islet, with the tower bearing about N.  $\frac{1}{4}$  E.

**Barbaran Islet** lies about 250 yards northwestward of the shore of the town, forming between, a passage with from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  fathoms of water, in the middle; the current is sometimes strong through this pass, and sets upon the shoal under the town.

**Tides.**—It is high water, full and change, at Parenzo, at 9h. 20m.; and the rise about two feet.

**LIGHT.**—On a small mole projecting southward from the central part of the town a *red* light is shown, visible two miles.

**Directions.**—The best channel to port Parenzo is between Barbaran

and Calbula islets; it is about 200 yards wide, and has a depth of six fathoms. In order to keep well clear of the shoal water off the N. extreme of St. Nicolo, which is marked by a buoy, the Barbaran side of mid-channel should be preserved, or keep one-third the distance from the latter islet.

The convent of St. Nicolo, the old tower on its northwestern part, and the town itself sufficiently indicate the position of the port.

**The COAST** between Parenzo and the Canale di Leme, six miles to the southward, is sinuous, becomes rather more elevated, and forms several bays, but, excepting Fontane and Orsera bays, they only afford shelter to boats or very small vessels with off-shore winds. The coast is bordered by islets, rocks, and shoals, but though they do not extend in any part more than  $1\frac{1}{2}$  miles from the shore, the whole of this part of the coast should be avoided. At night the light on Dente point at port Quieto should not be shut in, and should be kept eastward of a N. by E.  $\frac{1}{2}$  E. bearing.

**Port Fontane**, about  $2\frac{1}{2}$  miles southward of St. Nicolo islet, is a bay about three-quarters of a mile deep, 800 yards wide at its entrance, and open to the westward. Its shores are surrounded by rocks and shallow water, which extend off at the head of the bay a third of a mile, where the depth is two fathoms. Nearly in the center is a shoal patch with  $2\frac{1}{2}$  fathoms on it; elsewhere the depths are from  $3\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms.

In the approach to the bay, between St. Brigida islet on the N. and Grande Reveda islet which is 60 feet high, and forming with Fontane point—being connected by shallow water—the S. side of the bay, are several shoal patches with from  $2\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms water over them, and nearly equi-distant between St. Brigida islet and Grande Reveda, on the S. side of the port, the sea breaks.

The anchorage, for small craft only, is in about four fathoms water, mud, at 300 yards from the S. shore of the bay, sheltered from all but westerly winds.

Fontane village and chapel, on the S. at the head of the bay, indicates the position of this anchorage. To avoid the shoals at the entrance, steer in with Grande Reveda islet, bearing E. until within half a mile of it; then steer to the NE., giving the islet a good berth, and round it for the anchorage.

**Marmi Grande Shoal.**—Of the numerous islets, rocks, and shoals fronting the coast between Grande Reveda islet of Fontane bay, and the canale di Leme, the outermost danger the Marmi Grande is 400 yards in length, with two fathoms water on it. Its centre lies with the summit of Grande Reveda bearing NE.  $\frac{7}{8}$  N., and Orsera castle E.  $\frac{7}{8}$  S., the outer edge of the shoal being  $1\frac{1}{2}$  miles from St. Giorgio island in Orsera bay.

Other dangers, with nearly the same water over them, lie a little within the above distance from the coast. Coasting vessels find their way among the several islets and dangers, but large vessels should give all this part of the coast a wide berth.

**Port Orsera** is a narrow inlet about half a mile deep, the inner part being shallow; the outer part, which is formed by St. Giorgio island on the SW., affords anchorage for small coasters in  $3\frac{1}{2}$  or four fathoms, mud. The port is open to the NW., but partly sheltered by Galiner islet and a shoal extending southward from it, on the N. side of entrance. Here is the beautiful white limestone, formerly quarried in large masses, and used in the buildings of Venice.

Vessels bound to this bay should pass N. of St. Giorgio island, between it and Galiner islet, avoiding the shoal extending southward from the islet. Orsera castle, on a hill on the NE. side of the bay, is a good mark for the port, and bearing ESE.  $\frac{1}{2}$  E. and in line with Galiner islet leads N. of the Marmi Grande shoal.

**Leme Shoal.**—The outer shoals fronting the coast between St. Giorgio island and the entrance to the canale di Leme are the Marmi di Mezzo with two fathoms water on it, about a third of a mile southward of Marmi Grande; and the Marmi, marked by a stone beacon nearly a quarter of a mile to the SE. Within these shoals are other sunken dangers, and two or three islets. The Leme shoal, nearly half a mile in length, E. and W., is the last of these dangers N. of the entrance to the Leme. It has from  $1\frac{3}{4}$  to four fathoms on it, the least depth being near the E. end, which is half a mile from the islet at the N. point of entrance to the canale di Leme.

The beacon marking Marmi shoal stands on a rock which is six feet above low water; it is 16 feet high, painted white, and surmounted by a ball and vane with the letter "M."

**Canale di Leme.**—The entrance to this narrow inlet is about  $2\frac{3}{4}$  miles northward of Rovigno. The channel runs in eastward nearly six miles, its greatest breadth being a little more than 600 yards, narrowing at the head. It is entirely bordered by high land, the shores are steep, and it has a depth of 17, 14, and 10 fathoms, hard mud, good holding ground throughout. Water is scarce; quantities of firewood are exported hence to Venice.

The best passage into the canal is between Leme shoal on the N. and Croce point on the S., which is elevated, of bold approach, and easily recognized at a distance. The passage on the N. side of Leme shoal is narrow, and the N. extreme of the entrance is bordered by the Fojada shoal, which projects southward 300 yards and is steep-to.

**ROVIGNO.**—The town of this name stands on a rocky projection

with a bay on either side of it. It contains several churches, including a cathedral built after the model of San Marco at Venice, two hospitals, manufactures of sail-cloth, shipbuilding yards, &c., and contains about 11,500 inhabitants. Several trading vessels belong to the port, and a number of small craft are employed in the sardine and tunny fishing. It carries on considerable trade with Vencie, Trieste, and the various ports of Dalmatia. Formerly it was a place of call for pilots. Water is scarce, but all kinds of provisions may be obtained.

**Bora** is the name of the bay immediately northward of Rovigno town; it is open to the westward, but partly sheltered from the NW. by Figarolo islets. In the center of the bay is a bank with five fathoms water on it; between the bank and town the depth is 13 fathoms, mud, which is the best berth for large vessels. Small vessels anchor farther in, and secure to the shore under the town.

**Port Rovigno** is the little bay S. of the town formed between it and Santa Caterina island, which is about 68 feet high; the anchorage is indifferent, being entirely open to the westward, and is visited by small vessels only. The best berth is in the bay southeastward of Santa Caterina island. Boats find shelter on the E. side of a mole projecting about 200 yards southward from the town.

**LIGHTS.**—At  $2\frac{1}{2}$  miles S. by W.  $\frac{1}{2}$  W. from Rovigno, a chain of islands or islets extending southward terminates in the little islet of San Giovanni di Pelago, from which is exhibited at 73 feet above the sea a light showing white and *red* alternately *every two minutes*, and in clear weather should be seen at a distance of 14 miles.

On the mole at the port of Rovigno is a *fixed* light showing *red* seaward, and white within the mole; it is visible two miles.

**DIRECTIONS.**—On making the land from abreast of Rovigno, mount Caldero or Maggiore, appearing to be divided into two parts, will be seen northeastward, and afterwards the high conspicuous steeple of St. Eufemia at Rovigno. Vessels from the southward may pass at a short distance westward of San Giovanni di Pelago, Astorga, and St. Andrea islets. The SE. side of San Giovanni di Pelago is shoal. St. Andrea, the largest of the group N. of San Giovanni di Pelago, is 62 feet high, and nearly divided in two by a low neck in the center, covered with wood, and has a monastery on its N. part; shallow water extends a little westward from the islet. To the northward of St. Andrea islet, all dangers will be cleared by keeping to the westward of the line passing through San Giovanni di Pelago and Figarolo islets of Bora bay.

The passage on either side of Santa Caterina island may be taken by small vessels, avoiding its SE. extreme, which is shoal about 100 yards off.

A shoal with four fathoms water on it lies 300 yards westward of the SW. part of Santa Caterina.

**Anchorage.**—There is a temporary anchorage off Rovigno, in about  $17\frac{1}{2}$  fathoms, sandy bottom, with the cathedral bearing about E.  $\frac{1}{2}$  N., distant  $3\frac{1}{2}$  miles, and San Giovanni di Pelago light-house SE. by E.

**Bagnole**, a small islet, 1,200 yards westward of Santa Caterina on the S. side of Bovigno, was formerly the signal station for pilots. This islet is steep-to.

**The COAST** from Auro point, the S. extreme of port Rovigno to Fasana channel, is less elevated than in the vicinity of Rovigno, and gradually becomes lower towards the S. It forms several small bays which are seldom visited excepting by coasters to load with firewood, and are all open to the westward. It is bordered, as far as Barbariga point six miles to the SE. of San Giovanni di Pelago light-house, by islets or rocks and sunken dangers, which, except the Secca Porer, do not reach more than three-quarters of a mile from the shore. The southernmost of the rocks above water is the Porer.

The Secca Porer has about  $4\frac{1}{2}$  fathoms water on it, and is the outer danger off this part of the coast. It is steep-to with 10 and 18 fathoms close around, lies nearly two miles from the coast, with the Porer rock bearing ENE.  $\frac{3}{4}$  E. nearly, distant  $1\frac{3}{10}$  miles, and San Giovanni di Pelago light-house NW.  $\frac{3}{4}$  N.  $4\frac{3}{10}$  miles.

**BRIONI ISLANDS.**—These two islands are about  $2\frac{1}{2}$  miles southward of Barbarigo point; they run nearly parallel with the coast, forming the channel of Fasana. They are of marble, ranging from 50 to 134 feet high, and covered with fine underwood and aromatic shrubs; their shores are irregular and form numerous little bays and inlets. Numerous islets or rocks and shoals lie on their W. and N. sides, and the whole together occupy a space of about four miles. The lesser Brioni, the northernmost of the two, has the form of a horseshoe, with a bay on its S. side, in which coasting vessels anchor in four fathoms. muddy bottom, and are well sheltered by the greater of the two islands.

To the northwestward of the lesser Brioni is a group of five islets surrounded by shoals, and nearly connected to the island by reefs. At about 1,200 yards outside or westward of these islets, and extending nearly  $1\frac{3}{10}$  miles from Brioni, are four shoals, of which one is awash, the others with two and three fathoms water on them. The Cabula shoal, the most northern and the one awash, is marked by an iron pole with a white ball on it  $3\frac{1}{2}$  feet in diameter, and 13 feet above the sea.

To the southward of the northern islets is another group of five islets lying a short distance westward of the greater Brioni and covering an indentation named Madonna bay. There is a depth of about four fath-

oms into the bay N. of Gallia, the northern islet; and 10 fathoms between Orsera, the southern islet, and the shore of Brioni. At half a mile NW. from Gronghera islet, the western of the southern group, is the shoal of the same name with  $3\frac{1}{2}$  fathoms water on it. Small vessels may safely anchor in Madonna bay in four to five fathoms. The largest of the five islets and only one wooded is Vanga.

**LIGHT.**—On Pedena point, the S. extreme of the Brioni islands, is a light-house which exhibits, at 65 feet above the sea, a white light showing a *flash* every *thirty seconds*, and seen in clear weather from a distance of 14 miles. The light is not visible from the northwestward when bearing to the southward of SE. by E. easterly.

**Anchorage.**—In case of necessity during a bora or northeasterly gale, a vessel may anchor at  $1\frac{1}{2}$  miles westward of Vanga Islet, in about 21 fathoms water. Also, about three-quarters of a mile southwestward of cape Compare, in 21 fathoms, with cape Compare light-house bearing a little eastward of NE.  $\frac{1}{2}$  N. At both anchorages vessels will be exposed to westerly and southerly winds.

**Fasana Channel** is between Brioni islands and the coast. In the N. portion of it a considerable number of vessels of any size may find shelter from all winds but those from about NW., in which direction the channel is open; the S. portion, although of sufficient depth, has bad holding ground, consisting of a bed of rocks, which unites Brioni islands with the coast. Large vessels should anchor in about nine fathoms, mud and shells, with the E. extreme of the larger Brioni bearing about S.  $\frac{1}{4}$  E., and Fasana village ESE. Small craft generally anchor at a short distance from the village, with it bearing about SE. A great quantity of fish may be caught here.

**LIGHT.**—A small mole projects about 200 yards to the SW. from the N. end of the village of Fasana, and from its extremity, at 23 feet above the sea, is shown a *fixed* white light, visible eight miles.

**Directions.**—Vessels passing to the northward of Brioni islands on the way to Fasana should avoid the Cabula shoal by keeping to the northward of a line joining San Marco islet, which lies about half a mile to the E. by S. from the shoal, and the N. extreme of the lesser Brioni.

The shores in the vicinity of Fasana are generally low, well wooded, and cultivated. Dignano village, which is on a hill 423 feet high, and the clock tower of which is visible at a considerable distance, helps to point out the position; it is about  $2\frac{1}{2}$  miles to the NE. by E. of Fasana village.

**Cosada Shoal.**—At the S. end of the Fasana channel are the two islets of Girolamo and Cosada, having a narrow passage, with  $4\frac{1}{2}$  fath-

oms water between them. At about a quarter of a mile northward of Cosada islet is the shoal of the same name about 400 yards in extent, with  $2\frac{1}{2}$  fathoms on it. Fort Musil just over Cristo point bearing S.  $\frac{3}{4}$  E. westerly, leads westward of the shoal and in the deepest water between the two islets.

The passage, from the depth of five fathoms on either side between the Cosada shoal and that extending from Brioni, is about 350 yards wide, and carries seven to 11 fathoms.

There is anchorage for small vessels inside Cosada islet, in four or five fathoms.

**Beacons.**—The eastern coast of the greater Brioni is bordered by shallow water, and its edge is marked by a truncated pyramid beacon eight feet high, four sides, each painted half white and half red vertically with eight metres in black (or  $4\frac{1}{2}$  fathoms), the depth of water in which the beacon is moored. A similar beacon, in the same depth of water, marks the western edge of the Cosada shoal; the distance between the two beacons is 500 yards, and they lie WNW. and ESE. of each other.

**POLA.**—The town of Pola is one of the most ancient in Istria, and several interesting Roman remains are still visible, particularly the amphitheater of massive blocks of white marble, which forms a conspicuous object when approaching from sea. The only other building deserving notice is the cathedral built in the ninth century. Pola being the principal Austrian naval station, has its dockyard, floating dock, marine hospital, and barracks. The population is about 10,000 and consists mostly of sailors and soldiers. Extensive fortifications crown the heights around the port, and numerous forts and batteries command the entrance.

The port is an exceedingly fine basin, almost land-locked, with room for a great number of vessels of any size, and as it is surrounded by hills the *bora* is seldom felt here with much force. The entrance, which is open to the NW., is between Cristo point on the N. and cape Compare, which is rather elevated and steep on the S. Thence the port trends in to the SE. and NE. forming a concave to the southward. At about  $1\frac{1}{2}$  miles within the entrance are three small islets dividing the interior into almost two equal parts; these islets are named St. Catarina, which is on the N. and low; St. Andrea the middle islet is larger and rather elevated, with a strong fort on it; and St. Pietro, a few yards from the S. shore, is low and has also a fort on it.

The passage for large vessels is between the two latter islets; it is about a quarter of a mile wide, and carries from six to 14 fathoms. The passage between the two northern islets and between them and



the N. shore is fit only for vessels of light draught. In the inner part of the port off the town is the islet of Olivi; it was formerly covered with olive trees, but now has a great many buildings on it. A rocky shoal extends from it to the northeastward, leaving a passage with three fathoms of water between it and the shore bank; the edges of the shoal are marked by four buoys. A mole is in course of construction to connect the islet with the town of Pola.

The anchorage is everywhere good; the best berth is to the southward of Olivi islet in 11 fathoms water, tenacious mud. Small vessels make fast to the quays of the town. No foreign vessel of war is allowed inside fort Franz of St. Andrea islet without special permission from Vienna. It will therefore be necessary to anchor in about 16 fathoms, outside St. Andrea islet, or make fast to the buoy there. The anchor should be dropped nearer the S. than the N. shore, to avoid the sea which sets in with strong westerly winds.

**Time Ball.**—A time ball for the meridian of the observatory at Pola will be dropped daily from the SW. bastion of Harbor castle, 131 feet above high water, at the instant of mean noon, when a gun will be also fired.

If one or more vessels should desire to know the mean noon time of Greenwich ( $0^h 55^m 23^s.5$  after mean noon of Pola), it should be communicated in time to the Hydrographic department, and it will then be signaled in the same manner as the mean noon time of Pola.

If the ball does not drop at the correct time, it will be again hoisted half way up five minutes after, and after an interval of 15 minutes slowly lowered.

Should anything occur to prevent the use of the apparatus, the time of mean noon will be signaled from the Hydrographic department by lowering a *blue flag* at the exact time.

The longitude of the Observatory at Pola in time is  $0^h 55^m 23^s.5$  E. of Greenwich.

**Tides.**—It is high water, full and change, at Pola, at  $9^h 16^m$ ; and the rise about  $3\frac{1}{2}$  feet.

**LIGHTS.**—A *fixed* white light is exhibited at cape Compare, at an elevation of 56 feet above the sea, and in clear weather, should be visible from seaward though an arc of  $180^\circ$  or between the bearings of NE.  $\frac{1}{4}$  E. and SW.  $\frac{1}{4}$  W., from a distance of 10 miles. The light is shown from an iron standard 21 feet high attached to the keeper's dwelling, which is 13 yards from the sea.

On a little mole at fort Franz, on the N. side of the passage into port Pola, is a small *red* light.

On St. Pietro islet on the S. side of the passage, is a small *green* light.

These two latter lights are visible towards the entrance of the port, and within the port the *red* light is seen to within about 200 yards S. of Olivi islet.

A small *red* light near the S. end of Olivi islet, and a similar light on the shore of the town in line, indicate the direction of the water pipes leading to Olivi islet.

In the inner part of the port, 600 yards N. of Olivi islet, two white vertical lights, five feet apart, are shown from a light vessel.

**Buoys.**—The bank lying E. of Olivi islet is marked by six buoys moored at equal distances around the outer edges of it. A mooring buoy painted white is planted in the harbor of Pola, between the islets of Olivi and San Andrea, 220 yards W. by N. from the compass buoy, and marked No. 14.

This buoy, as well as mooring buoy No. 16, lies about 80 yards westward of the course of incoming steamers.

During thick or foggy weather, two consecutive blasts of a horn will be sounded every 15 minutes, on board the light-vessel moored in the port of Pola, to the northward Olivi islet. This signal will be made during daylight only, or when the lights are not lighted.

This signal is made for the special benefit of the regular steamers trading at this port. When any of the said steamers are to arrive or depart during the night, or during the time that the lights are lighted, two consecutive blasts of the horn will be sounded every two minutes, commencing half an hour before the time of arrival or the time fixed for the departure of the steamer, and continuing until the steamer has passed by the light-vessel.

**Torpedo Ground.**—On the E. side of entrance to port Pola, between Grosso point and Zonchi battery, is a space generally used for submarine or torpedo experiments. The limit, when in operation, is marked by a guard boat distinguished during the day by a red pendant, and at night by a *fixed* white light. A *flashing* light will also be exhibited from the guard boat when vessels are entering or leaving the port. Vessels should keep southward of the guard boat.

**Water** is abundant; a supply sufficient for a fleet may be obtained from a spring—called the Roman baths by the inhabitants—near the beach, about 400 yards from the town; and elsewhere.

**Directions.**—The land about Pola generally is not high, and the only remarkable points near the entrance are capes Compare and Brancorso (each with a fort or battery over them), which are steep, and the highest points on this part of the coast. The latter is about eight miles north-eastward of cape Promontore, and may be easily recognized from its being the first rather elevated land to the northward of it.

On approaching the harbor, the square fort, the town, and the amphitheater will be seen at the head of the bay, and as there are no sunken dangers, and but one passage into the port for large ships, *i. e.*, between St. Andrea and St. Pietro islets, a vessel will have no difficulty in reaching the anchorage.

At night the *fixed* light on cape Compare, and the *flashing* light on Pedena point, the S. extreme of the Brioni islands, will indicate the position of the port. A sailing vessel prevented by contrary winds from entering, may anchor in 21 fathoms, mud, under the land between the two capes.

**The COAST** of cape Brancorso is uncultivated and gradually decreases in height towards cape Promontore. There is generally a depth of 20 fathoms at about one-third of a mile from the shore. There are several small bays which afford shelter from off-shore winds; the most important of these are ports Véruda and Olmo.

Mount Bombista, 305 feet high, to the southward of two islets near port Veruda, separates the ports of Olmo grande and Olmo piccolo. Olmo grande is a narrow inlet affording shelter from all winds to vessels drawing not more than 10 feet. Olmo piccolo to the southward, is more exposed, and suitable for boats only.

**Port Veruda** is about  $3\frac{1}{2}$  miles southeastward of cape Compare, and is formed by two narrow inlets, bordered by hills from 100 to 140 feet high. The passage to Cacoja, the southern inlet, is narrow and access to it is round N. of Veruda islet; the northern inlet is therefore to be preferred; here vessels anchor with mount Gallie, NE. in four or five fathoms, hard mud, and are well sheltered from all winds.

A vessel prevented by contrary winds from entering port Veruda, may anchor in about 23 fathoms, sand, shells, and mud, between Veruda islet and St. Giovanni point.

**LIGHT.**—At Verudella point on the N. side of entrance to port Veruda, a *fixed red* light is shown, which should be seen from a distance of eight miles.

The light is visible from seaward through an arc of  $144^\circ$  or between the bearings of SE. by E.  $\frac{3}{4}$  E. and NNW.  $\frac{1}{2}$  W.; from NNW.  $\frac{1}{2}$  W. it is obscured through an arc of  $60^\circ$  or to the bearing of W.; and is again visible towards port Veruda.

**Directions.**—Veruda islet, about 62 feet high, lies at the entrance of the two inlets forming the port, and may be recognized by a ruin on its summit. Two other islets are to the southward of it, and the three are united to the coast by a reef. The passage is between Veruda islet and Verudella point on the N. Cape Promontore will assist to indicate the position to vessels from the southward, and capes Compare and

and Brancorso to those approaching from the northward. At night the *red* light will show the entrance to the port.

As foul ground extends around Verudella point, it should not be approached nearer than 200 yards.

**CAPE PROMONTORE**, the S. extreme of Istria, is a low narrow hilly projection, and difficult to define when the atmosphere is not very clear. There are several dangers off the cape, and the currents are often rapid, with strong eddies in its vicinity, caused by streams setting out of the gulf of Quarnero.

It is customary for vessels bound to Venice or its neighborhood to sight the cape; on approaching from the eastward in clear weather, the steeples of the three villages of Sissano, Medolino, and Promontore will be seen on the hills in succession, together with Porer light-house; when from the opposite quarter the steeple and village of Promontore with Porer light-house only will be visible.

At night, from the westward in standing towards cape Promontore or the land to the northward of it, the Porer rock light should not be lost sight of by bringing it to bear southward of SE., and in crossing the ray of *red* light shown over the Sunk rock, there will be no difficulty in verifying the vessel's distance from the light. Galiola islet light, when in sight, kept *eastward* of an E. bearing, will lead southward of the Sunk rock.

**Felonega islet** lies about 200 yards off the W. extreme of the cape, on the NW. edge of a rocky ledge, which extends from the shore to 400 yards southward of the Porer rock light-house; in the middle of the ledge, between the light-house and islet, there are two patches with from two to six feet water on them, and elsewhere three and four fathoms; and to the E. by S. of the islet, distant about 350 yards, is another shoal patch with two feet of water on it.

**Beacons.**—The shoal patches are marked by iron poles, upon the upper ends of which are *two white disks at right angles to each other*; from a distance these appear as spheres. Above the disks is a small *white iron vane*.

The poles are painted *dark brown*, and are planted in the ground in the following positions: The first beacon on the shoal nearest the Porer rock is in about  $5\frac{1}{2}$  feet water, with the light-house bearing WSW.  $\frac{1}{2}$  W., and Promontore church tower N.  $\frac{3}{4}$  E.; it has a height of 27 feet above the water; the diameter of the disks is four feet. The second beacon is in nine feet, on the shoal nearer to Felonega islet, with Porer light-house S.  $\frac{1}{4}$  W., and Promontore church tower N. by E. nearly; it has a height of 23 feet above the water; the diameter of the disks is four feet; and the third beacon is in  $4\frac{1}{2}$  feet, ESE.  $\frac{1}{2}$  E. from the middle of

Felonega islet, with Porer light-house SW.  $\frac{3}{4}$  W.; its height is 13 feet and the diameter of the disks three feet.

There is a depth of only 13 feet about 20 yards SW. of this sea-mark.

These beacons, with others on this coast, are occasionally carried away by the sea, and caution with reference to them is necessary.

**Sunk Rock.**—This danger lies  $1\frac{1}{2}$  miles S. by E.  $\frac{3}{4}$  E. nearly from the light-house on Porer rock, and has only nine feet water on it. There are  $5\frac{1}{2}$  and seven fathoms, close to on its S. and E. sides, and immediately outside, deep water all round. Between the Sunk rock and Porer light-house is another rocky patch, 1,800 yards from the light-house, with five fathoms on it, and deep water near it. A ray of *red* light from the light-house shows over these dangers.

**LIGHT.**—On the Porer rock, which lies about a mile SW. from the W. extreme of cape Promontore, is a white light-tower 88 feet high, which exhibits at 111 feet above the sea, a *fixed* white light seen in clear weather from a distance of 16 miles. The light is visible from seaward between the bearings of SE. and W.  $\frac{1}{2}$  S.; this latter bearing passes about a quarter of a mile inland of the cape and inside Fenera islet.

Also, a *fixed red* light, at an elevation of 39 feet above the sea, and 22 feet above the ground is shown from the same tower to denote the position of the Sunk rock. This light has a green, a red, and a white sector, and shows over an arc of  $169^{\circ}$ .

The green sector shows over an arc of  $95^{\circ}$ , between the bearings of N.  $7^{\circ} 40'$  W. and N.  $87^{\circ} 20'$  E.

The red sector shows over an arc of  $26^{\circ}$  between the bearings of N.  $7^{\circ} 40'$  W. and N.  $33^{\circ} 40'$  W. over a sunken rock, and for 600 yards on either side of it.

The white sector shows over an arc of  $48^{\circ}$  between the bearings of N.  $33^{\circ} 40'$  W. and N.  $81^{\circ} 40'$  W.

Porer rock light-house is connected to the main (Radovizze bay) by an electric cable.

**GULF of MEDOLINO.**—This gulf is formed between cape Promontore and Merlera point; the distance between the two points is nearly four miles, but within the gulf narrows considerably and extends more than three miles to the NW., forming some well-sheltered anchorages. There are several islets and rocks in the gulf, which, as well as its shores, are surrounded by shallow water, and which renders caution necessary in unfavorable weather in threading the way into the gulf. The best of these anchorages are the following:

**Port Rosso** is about three-quarters of a mile northwestward from the E. extreme of cape Promontore; it is in a small bight of the coast,

protected from sea winds by Fenera and Cielo islets and rocks, and has a depth of three fathoms, muddy bottom, and fit for coasters.

*Beacons on Fenera bank and Cielo reef, Medolino bay.*

Each beacon consists of a *dark iron staff surmounted by a white hoop-iron sphere* four feet in diameter, over which is a *white wind-vane*. The beacon on Fenera bank, the next shoal to the NW. by W. of the island of the same name, is in the middle of the bank, in nine feet, and is elevated 21 feet above the level of the sea at mean low water.

Bearings as follows:

Cape Promontore . . . . . SW.  $\frac{3}{4}$  S.  
SW. by S. extremity Cielo island . . . . . NW. by W.

The beacon on Cielo reef, the next shoal which breaks, to the SE. by S. of the island of the same name, is on the SE. edge of the reef, in five feet, and is elevated 20 feet above the level of the sea at mean low water.

Bearings as follows:

W. extremity of Fenera island . . . . . SE.  $\frac{1}{2}$  S.  
Merlera point . . . . . NE.  $\frac{1}{2}$  E.

**Castello, Ronze, Medolino, and Pomer** are small anchorages near the head of the gulf, which are suitable to coasting vessels only. The passage to them is about 400 yards wide, and the depth from three to four fathoms.

Vessels occasionally anchor between Cielo and Trombola islets, in  $7\frac{1}{2}$  to 11 fathoms, good holding ground.

**DIRECTIONS.**—There are three passages to the anchorages in the gulf of Medolino, in taking any one of which the numerous rocks and shoals should be carefully avoided. The first, which is usually preferred by vessels visiting Rosso, is between cape Promontore and Fenera islet. Mid-channel should be preserved by steering for Cielo, and when the entrance to the port has opened out, the passage either between Solkovatz islet and the coast, or to the northward of this islet should be taken, according to the wind.

To proceed to the anchorage between Cielo and Trombola, the passage between Sta. Marina and Cielo islets is generally taken, and the anchor dropped northward of the latter. This passage presents no difficulty, and should be used by vessels bound to the anchorages at the head of the gulf, and which is a straight course. If the passage leading to Rosso is taken, the shore should be avoided on arriving abreast of this port, and a course steered between Trombola and Cielo islets to avoid Sorico, a nearly dry shoal, 700 yards westward of Cielo islet.

There is also a passage between Sta. Marina islet and the N. shore; care should be taken to keep in mid-channel where there are two fathoms water, in order to clear the shoals on either side.

**MERLERA POINT**, the western extreme of the entrance to Quarnero gulf, is four miles NE. by E. of cape Promontore; the point is 66 feet high, bare, and bold of approach. Two islets, the Lievela grande and Lievela piccolo, lie a mile to the SW. of it. There are four fathoms water between the two islets, but between the former islet and the shore the water is shoal.

A *fixed red* light, visible when it bears between the mouth of Arsa channel and a line leading from the light to 600 yards SE. by E. of Fenera rock, is exhibited from Merlera point. NE. by N. of cape Promontore. This light will be shown until the completion of the light-house now in course of construction at that place.

## CHAPTER VIII.

### QUARNERO GULF AND ISLANDS.

. VARIATION in 1883.

Grea' Quarnero channel, entrance,  $10^{\circ} 24'$  W.  
Quarnerolo channel,  $10^{\circ} 09'$  W.

Fiume,  $10^{\circ} 19'$  W.  
Grossa island, NW. end,  $9^{\circ} 59'$  W.

**QUARNERO GULF** washes the eastern coast of Istria on one side, and the entire seaboard of Hungary and Croatia, and the coast of Dalmatia, nearly as far as Nona town, on the other. It extends southward to Bianche point of Grossa island, and eastward to Ljubaz strait, which separates the S. end of Pago island from the coast of Dalmatia, and contains numerous islands, rocks, and shoals.

The larger islands in the gulf of Quarnero, as well as those on the coast of Dalmatia, are in communication with each other and with the mainland by means of telegraphic cables, and it is necessary to avoid anchoring or fishing in their vicinity.

**The Eastern Coast of Istria** includes the space between Merlera point and Fiume, an extent of about 45 miles, and presents mostly a wild, desolate appearance, consisting, as far as the eye can reach, of extensive forests, with a few intervals of cultivated patches; the sides of monte Maggiore and the vicinity of Fiume being nearly the only exceptions to these features. The high lands of the peninsula are chiefly on this side, and are ramifications of the Julian Alps; the range of monte Maggiore or Caldero, 4,575 feet high, being the most remarkable for the abruptness with which its eastern side rises from the midst of the hills branching from it, and which gradually decrease in height to the S.

The coast is generally rocky, precipitous, and of forbidding aspect, but there are no dangers within half a mile of it; it affords among its indentations a few narrow bays, but unsuitable for large vessels.

In fine weather the ebb and flow of the tidal wave is regular; at other times the degree of irregularity, caused in a great measure by the channels, among the numerous islands, depends upon the force and direction of the wind.

The bora is the wind most severely felt in this gulf, as well as on the western side of Istria, and scarcely a blade of grass will grow on spots



fully exposed to it; but it is the less dangerous to vessels, as it blows either off the shore or parallel with it. Strong southeasterly winds cause a considerable but not dangerous sea to roll in. The navigation of the gulf is therefore easy, and dangerous only from the frequent heavy gales.

**Aspect.**—The chief points of recognition, on approaching the Quarnero gulf from southeastward, are mount Ossero, 1,909 feet above the sea, near the northern end of Lussin island; afterwards monte Maggiore, and then cape Promontore and Porer rock light-house. Mount Ossero is easily recognized by its naked conical white top. Mount Maggiore, which rises above its surrounding elevations, and is visible at a great distance, has a conical, forked, summit. Cape Promontore is formed by a number of low hillocks, mostly covered with bushes, which, in clear weather, are first seen on the horizon; and a mile southwestward from it is the light-house. The summits of both Ossero and Maggiore are clouded shortly before and during sea winds, especially southeasters, and become clear suddenly at the cessation of them.

**Port Cuje** is a small inlet about  $1\frac{1}{2}$  miles northward of Merlera point, and is suitable for small vessels only. The point on the left side of entrance is shoal, and a reef of rocks, some of which are just above water, lies rather more than half way between Merlera point and the port, extending more than a quarter of a mile from the shore, and in the way of vessels bound to Cuje.

**Port Bado.**—Between port Cuje and Zuffo point, about four miles farther on, the coast is high, steep, and well wooded. On the N. side of Zuffo point is an inlet, about  $1\frac{1}{2}$  miles deep and nearly a quarter of a mile in breadth, surrounded by high land, called port Bado; in almost every part of which coasting vessels load with firewood. There is anchorage at the head of the bay, in nine fathoms water, mud. Water may be obtained.

In entering port Bado, the high Zuffo point should be closed so as to avoid a rocky shoal, extending southward 300 yards from the N. point of entrance; the shoal uncovers with the tide.

**Vignole Bay**, about two miles northward of port Bado, affords shelter to small vessels in westerly and northerly winds, but is quite exposed on the S. and the E. quarters. A rock with nine feet water on it lies in the middle of the entrance.

**ARSA CANAL.**—This so called canal is a natural inlet, six miles in length and somewhat less than half a mile in breadth, receives the waters of the Arsa river, the source of which is lake Gessaro, at the foot of monte Maggiore. The canal has several good anchorages for vessels of moderate draught, which ascend as far as Traghetto. Southwesterly

winds send a sea into the entrance, which, however, is not felt beyond Castel vecchio, two miles within the entrance.

Vessels may anchor on both sides of the canal, but as the depth increases rapidly towards the middle, bora squalls would in all probability cause the anchor to drag considerably before bringing up, and it would therefore be advisable to lay out an anchor to the northeastward. Vessels anchoring should prefer the starboard side going in.

Port Carnizza is an inlet on the W. shore at the entrance to the Arsa canal; it is surrounded by high land, and has a depth of about  $5\frac{1}{2}$  fathoms, muddy bottom. It is seldom visited except by large boats to load with firewood. The best berth is off the village. Water may be obtained at the upper part of the inlet.

Port Gradaz is an indentation of the land two miles above the entrance on the E. side of Arsa canal, and is the best harbor in the canal; it has a depth of 10 to 18 fathoms. Mount Ubas, 244 feet high, the shore of which forms the S. side of port Gradaz, serves to indicate the entrance to Arsa canal; it is a tongue of land covered with wood, and of whitish appearance near the sea, and terminates on the S. in the point of the same name.

**NERA POINT**,  $3\frac{1}{2}$  miles eastward of Ubas point, is of considerable elevation, thickly wooded, and visible at a great distance, as is also mount Goly, 1,756 feet high, from which it is a spur. Between Ubas and Nera points are two small bays open to the southward, but sheltered from northerly winds between WNW., and ENE.

A vessel should not anchor nearer the shore than 11 fathoms, in order to avoid rocky bottom, especially in the westernmost of the two bays.

**LIGHT.**—On Nera point is a white light-house, which exhibits, at 44 feet above the sea, a *fixed* white light, visible 11 miles.

In steering to the northward for the gulf of Fiume, vessels will have this light on the port hand, and the *fixed* and *flashing* white light on the Zaglava rock on the starboard hand. The two lights are about  $6\frac{1}{2}$  miles apart, and bear nearly ESE.  $\frac{1}{4}$  E. and WNW.  $\frac{1}{4}$  W. from each other.

**Port Lungo**, about five miles to the northward of Nera point, is an inlet more than a mile deep, open to the southward, with depths of from 22 fathoms at its entrance to eight fathoms at its head, good holding ground. The inlet is too narrow to be taken, except by small vessels. Southerly and southeasterly winds send a heavy sea into the inlet; and it is necessary to secure to the weather shore against the violent bora squalls. There are no villages here.

**PORT RABAZ**, about two miles northward of port Lungo, is a bay about a half a mile deep, and 600 yards wide, and affords shelter to coasters from westerly and northerly winds, good holding ground.

Southerly and southeasterly winds are severely felt, and the bora reaches the bay in violent gusts. There are a few houses on the beach. This anchorage serves as a port to the ancient town of Albona, standing on an eminence about  $1\frac{1}{2}$  miles to the westward of it. A rocky shoal extends off about 200 yards from St. Giorgio point, on the S. side of entrance to the bay.

Water may be obtained in abundance at a spring.

**LIGHT.**—On St. Andrea point, at the E. side of entrance to the bay, is an iron column, from which is shown, at an elevation of 34 feet above the sea, a *fixed green* light, visible seven miles.

**Fianona Inlet.**—Between Nera point and this inlet, distant about  $10\frac{1}{2}$  miles, the coast is precipitous and thinly wooded. Fianona inlet is about 600 yards wide at the entrance, gradually narrows to its head, and extends nearly two miles northwestward. The soundings are 27 fathoms at the entrance, to four fathoms, muddy bottom, at the upper and narrower part, where the village of Fianona stands on a hill, the site of the ancient town of this name. The inlet is open to the SE. and visited by heavy bora squalls, against which it is customary to secure by laying out cables to the shore. Fianona and Rabaz are the two chief places of export for the produce of the eastern side of the Istrian peninsula. From seaward the position of Fianona inlet appears like a deep cutting in the mountains.

Water is plentiful, and provisions may be obtained.

**Coast.**—Between Fianona and port Priluka, at the northern angle of the Quarnero, there are about 15 miles of coast, which present a less desolate appearance than that to the southward. A few villages and patches of cultivation are visible, especially on the slopes of monte Maggiore and in the neighborhood of Fiume. The coast is almost everywhere high, abrupt, bordered by deep water, and without any shelter, excepting little boat creeks, protected by moles.

A telegraphic cable runs from Stupova cove, about  $2\frac{1}{2}$  miles northward of Fianona inlet, to Farasima in Cherso, and vessels are cautioned as to anchoring.

The bay named port Priluka is only sufficiently large for a few coasters. Its position, which otherwise is unmistakable, is indicated by the town of Castua, near which is a white castle on an eminence.

**LIGHTS.**—At the little port of Ika, about  $3\frac{1}{2}$  miles southward of port Priluka, a white light is shown from an iron column 38 feet above the sea, visible two miles.

At Volosca, near Priluka, at the head of the gulf of Fiume, a *fixed* white light is exhibited from an iron standard on the mole head. The light shows *red* from seaward between the bearings of N. by E.  $\frac{1}{4}$  E. and

WNW.  $\frac{3}{4}$  W., and *white* over the remaining portion of the horizon; it is elevated 18 feet above the sea, and should be visible in clear weather from a distance of about five miles.

**FIUME** (Illyrian, *Reka*; German, *St. Veit am Flaum*), one of the most important commercial towns in the Adriatic, is the chief outlet for the produce of Hungary, and is rapidly increasing in importance. Extending about a mile along the seaside, and containing several imposing edifices, with high land in the background, it presents a picturesque appearance. A good road is carried over the Julian Alps to Carlstadt, where the navigation of the Save and Culpa becomes available. The town contains some 20,000 inhabitants, who with 2,000 or 3,000 more belonging to the district, are under the administration of a civil governor.

The local industries of Fiume, in addition to a tolerably active ship-building interest, are the famous paper manufactory of Messrs. Smith and Meynier, and an extensive manufactory of chemical preparations. The torpedo factory of Mr. Whitehead is about a mile W. of the town, and will be known by two small jetties; the machinery can manufacture about 300 torpedoes in each year. The chief articles of export are flour and timber.

Fiume is the only important seaport for the outlet of the produce of Hungary.

The number of vessels entered with cargoes in 1874 was 2,039, amounting to 142,129 tons; and in ballast 747, equal to 38,900 tons. The number of vessels cleared with cargoes in the same year was 2,014, amounting to 148,674 tons; and in ballast 769, equal to 35,486 tons. The value of goods imported amounted to about 1,049,870*l.*; and the value of those exported to 838,841*l.*

The principal exports are corn, tobacco, wood, fruit, and salted provisions; and the principal imports are sugar, rice, salt, and spices.

**Supplies.**—Provisions of all kinds are good and plentiful. Water is brought to the quay in a pipe, and runs out in a beautiful clear cold stream at a height of five or six feet above the sea, so that a boat of any size may lie under it. The place is convenient, being close to the landing place inside the mole.

At Fiume, there is a naval school, a military school, and a commercial school.

**The Port of Fiume** is formed by a breakwater extending from the eastern part of the town, and which is still in progress, in a W. and northwesterly direction, and when completed to its proposed extent will inclose an area of about 1,400 yards in length by two hundred at the entrance to 250 yards at the head on the E., with from nine to 18 fathoms

water, mud bottom. The course of the breakwater is marked by a line of buoys with a light-boat painted in red and white bands at its extremity; the boat has a small house in it, surmounted by a mast bearing a red and white ball. There are several moorings buoys painted white, both inside and to the westward of the breakwater, and from the great depth of water they are convenient to make fast to.

The sea face of the town is bordered by quays, and others are proposed; while on the E. side of the town is a harbor for small vessels, three fathoms deep, and protected on the E. by a mole running out from the right bank of the Reka river. This harbor is about 600 yards in length but so narrow as to occasion vessels to enter stern foremost, as its breadth does not admit of turning. One of the most conspicuous objects, in approaching Fiume from the southward, is the marine academy, a large square stone building having a red tiled roof, standing near the W. extreme of the town. The academy is surrounded by trees, and may be easily recognized by the great number of windows in it. Mount Drenova, two miles N. of the town, is also a good distant mark.

Although the distance across, in any direction, in the gulf of Fiume is not more than 10 or 11 miles, a heavy sea is sent in by winds from the southern quarter whenever they blow directly through the passage between Cherso and Veglia islands.

Vessels should not enter the port of Fiume at night without the assistance of an experienced pilot, and strangers without a pilot should either anchor or secure to one of the buoys in the road. Vessels should at all times pass westward of the light-vessel and between her and the shore light. Large ships should anchor off the port, in 20 to 24 fathoms, about three-quarters of a mile from the town, good holding ground.

In the vicinity of Pechine dockyard, is a buoy in the form of a four-sided pyramid painted in white and yellow horizontal bands; it is 250 yards from the shore, and is for scientific purposes, and should not be approached.

**Tides.**—It is high water, full and change, at Fiume, at 8h. 30m.; and the rise  $1\frac{1}{2}$  feet.

**Time Ball.**—On the projecting mole is a staff, 31 feet high, on which is hoisted at five minutes before mean noon, a black ball  $2\frac{1}{2}$  feet in diameter. At the instant of mean noon, Marine Academy, Fiume, or 57m. 46s.9 E. of Greenwich, the ball is dropped and a gun fired; the time should be taken from the commencement of the drop, or the flash of the gun. If by accident it should not drop at the proper time, it will be hoisted half-mast for *one minute*.

**Buoyage at Fiume.**—In the road of Fiume, from the breakwater to the westward, mooring buoys Nos. 4, 5, and 6 are placed in depths of 18 to 21 fathoms of water.

A mooring buoy has been placed in  $20\frac{1}{2}$  fathoms of water to southward of the light-ship.

Buoy No. 9 lies off the Fiumara in 15 fathoms of water. The moorings of these buoys are laid out from NE. by E. to SW. by W.

Between Adamich and Zichy moles buoys Nos. 1 and 2 lie in  $6\frac{1}{2}$  and 12 fathoms, and beyond Zichy jetty, in the middle of the entrance to the harbor, is buoy No. 3 in 14 fathoms. In the harbor inside the Adamich breakwater there are *three cylindrical red buoys* in depths of  $3\frac{1}{2}$  and  $4\frac{1}{2}$  fathoms.

**LIGHTS.**—On the N. side of entrance to the port, about 180 yards southward of the Academy, at an elevation of 39 feet above the sea, is a *fixed white light with red sectors*, visible in clear weather from a distance of 10 miles. A large globe, painted in alternate white and red vertical stripes, marks the position of the light by day.

A light-boat lies near the end of the breakwater, S. 350 yards from the light on the N. side of the harbor, and exhibits at 23 and 18 feet above the sea, two *fixed vertical lights*; the higher being *red*, the lower white, and visible two miles. The light-boat is painted in red and white bands, and during the day carries a wicker globe at the masthead.

On the head of the small inner mole named Adamich, is a *fixed light*, appearing *red* from the E. and W., and white from the N. and S., and visible about a mile.

A *fixed green light* is also exhibited at the head of Zichy pier, westward of the latter.

**Port Martinskizza**, about  $1\frac{1}{2}$  miles southeastward of Fiume, of which it is the quarantine port, is an inlet nearly 800 yards deep, and about 300 yards wide; the soundings decrease from 17 at the entrance to seven fathoms at its upper part. Vessels moor along the eastern shore on account of the bora. Small supplies may be obtained close to the beach. Ship-building is carried on here.

The entrance is easily recognized by the high point on the starboard hand, and by a hill, on the summit of which is a small chapel.

**Porto Re** is about six miles southeastward of Fiume, on the right side of entrance into Buccari bay. It is small, being about 700 yards deep, and little more than 200 yards wide, and sheltered from all but northwesterly winds, which send in a considerable sea; the depth in the middle is about 12 fathoms, mud, and good holding ground. The W. point of the bay is surrounded by a rocky shoal at the distance of 200 yards, the N. side of which is marked by a buoy. The port is

defended by a battery. Water is with difficulty obtained, and provisions are scarce at the town, which lies at the head of the port.

**LIGHT.**—On Ostro point at the S. side of entrance to Porto Re, is a light-house painted with red and white bands. It exhibits at 54 feet above the sea, a *fixed* white light varied by a *flash* every *three minutes*, and is visible from a distance of 12 miles.

Two lights are exhibited from the landing pier at Porto Re. One of these lights is *fixed red*, and the other *fixed green*; they are shown at an elevation of 13 feet above the level of the sea, and are visible from a distance of one mile. They are both catoptric, and are shown from iron lamp-posts.

Position: Latitude  $45^{\circ} 16' 26''$  N; longitude  $14^{\circ} 34' 06''$  E.

**BUCCARI BAY.**—This so called bay is nearly a land-locked basin  $2\frac{1}{2}$  miles in length NW. and SE., and from about 500 yards to 800 yards in breadth; it is surrounded by bold shores, and has from 12 to 20 fathoms of water and consequently accommodation for a considerable number of vessels of any size. The town of Buccari stands on the shore at the NW. end of the basin; and communicates with Fiume by a good road. The anchorage is off the town, in 12 to 15 fathoms mud, where vessels are best sheltered from the bora, which at times reaches the anchorage suddenly and with great strength. Water is abundant, and provisions may be obtained. Population, about 2,000. Shipbuilding is carried on to considerable extent.

The fort on the right of the entrance, and which also commands Porto Re, may be seen a long way off. On the western approach to the entrance, is a five-fathom patch, about 200 yards from the shore.

The entrance to the basin is open to the SW., and with the exception of the shoal around Ostro point on the right, the passage which narrows at the inner points to 450 yards, is deep and the shores bold.

During the middle ages the inhabitants of Buccari were pirates and the terror of the Adriatic coast.

**LIGHT.**—A *fixed red* dioptric light of the sixth order is exhibited from an iron lamp-post on the quay of the harbor office at Buccari, gulf of Fiume. The lamp-post is nine feet high; the light 13 feet above the level of the sea, and visible at a distance of two miles.

Position: Latitude  $45^{\circ} 18' 20''$  N.; Longitude  $14^{\circ} 32' 16''$  E.

**CHERSO ISLAND.**—This island forms with the coast of Istria the widest of the Quarnero passages. It is 35 miles in length N. and S., irregular in shape, its greatest breadth, which is near the middle, being only  $6\frac{1}{2}$  miles; thence northward it narrows to less than  $1\frac{1}{2}$  miles, becoming broader again towards its N. end. Its shores, except the northern portion, are somewhat broken, forming several small bays and inlets,

together with the large bay of Cherso, on the W. side of the island; the coast is more or less high and rugged, but of less elevation near the S. extreme. The E. side has few inhabitants, and extensive forests with barren wastes are only occasionally interrupted by houses and patches of cultivated ground.

The W. side has a less desolate appearance; the N. end, which is high, is studded with villages. The soundings are generally deep within 400 or 600 yards of the shore, and excepting a few shoals, which will be described, there are no obstacles in the vicinity of the island to the navigation of vessels of the largest size. The highest point is mount Syss, which rises 2,090 feet above the sea, near the narrowest part of the island and about  $6\frac{1}{2}$  miles from its N. end, while N. and S. of it are mountains of less elevations; in the center of the island is mount Perska, 1,406 feet high, over the head of Cherso bay.

It is unadvisable to sail near the eastern shore on account of the bora; the opposite side of the island is sheltered from this wind, and has several ports and safe anchorages. Strangers may take warning of a coming bora gale, by observing all the small craft hastening to the nearest places of shelter.

**Farasima.**—The village and cove of Farasima are nearly a mile northward of Prestenizze point, the W. extreme of Cherso; a telegraphic cable runs from this cove to Stupova cove in Istria, and care should be taken not to foul it. Another cable communicates with Grego morte cove, Veglia island.

**LIGHT.**—On Prestenizze point is a light-house, which exhibits, at 56 feet above the sea, a *fixed* white light varied by a *red flash* every *two minutes*, and visible from a distance of 12 miles. This is the narrowest part of the channel leading to the gulf of Fiume, being only  $2\frac{1}{2}$  miles from the coast of Istria.

**Pernata Point** is about  $7\frac{1}{4}$  miles eastward of Nera point of the coast of Istria, and forms the W. horn of Cherso bay. The point is bold and elevated, and the most remarkable point on the island; the land  $1\frac{1}{2}$  miles S. of it being 1,116 feet high.

**ZAGLAVA ROCK.**—This rock rises from a sunken bed nearly 400 yards in extent, and lies SSW.  $\frac{1}{2}$  W., about two miles from Pernata point, and half a mile from Cherso island, with 30 fathoms water between it and the shore, and eight and nine fathoms immediately to the SW. of it.

**LIGHT.**—On Zaglava rock is a light-tower, which exhibits, at 65 feet above the sea, a *fixed* white light varied by a *flash* every minute, and should be seen in clear weather from a distance of 14 miles. The tower is 49 feet high.



In steering to the northward for the gulf of Fiume, vessels will have this light on the starboard hand, and Nera *fixed* light on the port hand. The two lights are about  $6\frac{1}{2}$  miles apart, and bear nearly WNW.  $\frac{1}{4}$  W., and ESE.  $\frac{1}{4}$  E. of each other.

**CHERSO BAY.**—This bay is about  $3\frac{1}{2}$  miles wide at its entrance between Pernata point and St. Biagio point to the NE.; from this line the bay extends southward nearly five miles, and is protected in a great degree from all but northerly winds. Vessels may anchor above the middle of the bay, and at 400 or 600 yards from the eastern shore, in from 20 to about 26 fathoms water, good holding ground.

**PORT CHERSO.**—This inlet, on the E. shore of Cherso bay, is about  $1\frac{1}{2}$  miles deep, and about half way in is 400 yards in breadth, when it expands to 800 yards, and, though small, forms an excellent port. The water at the entrance is deep, but off the town which bears the name of the island it shoals to 10 and eight fathoms, mud bottom. The best berth is abreast a monastery to the SE. of the town. Small vessels anchor nearer the shore, to which they secure against the bora. There is a small basin, around which the town is built, capable of receiving small craft. The town of Cherso contains about 8,000 inhabitants. There is a spring of fresh water southeastward of the town, and provisions can be obtained. There are yards for the repair of vessels.

**LIGHTS.**—At Covacine, or Kimen point, on the N. side of entrance to port Cherso, is an iron pillar, from which is exhibited, at 24 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 10 miles.

At Molino point, in port Cherso, a little to the SW. of the town, a small white light, visible two miles, is shown when Lloyd's steamers are expected.

**Port St. Maritino** is a bay seven miles southward of Zaglava lighthouse, and is open to the southward; a considerable swell sets in with southwesterly winds. The best anchorage for small vessels is in 10 to 13 feet, mud, and abreast of a monastery, which is visible some distance off. The bay is somewhat protected from the SW. by Levrera island.

**Levrera Island.**—The passage into port St. Maritino N. of Levrera is about  $1\frac{1}{2}$  miles wide, and clear of danger. The island is about two miles in length N. and S., half a mile in breadth, and towards its S. end 208 feet high. Both sides of the island are bordered by shoal water, which extends off some distance. Between it and the coast of Cherso is the small inlet of Visoki, nearly round, 24 feet high, and except on the W. side, is surrounded by shoal water. At about a quarter of a mile NW. of Visoki is a patch with seven fathoms water on it.

**Ossero Channel** is the space between the NE. shore of Lussin island and the coast of Cherso, which at its head takes the name of Viaro bay. It affords good anchorage for vessels of any size. The anchorage is a mile northward of the town, or farther southward, hard mud. In entering the channel, Ossero point, the northern extreme of Lussin, which has a rock off it, must not be passed too close.

The town of Ossero, ancient *Absorus*, is now nearly uninhabited, owing to its insalubrity. It is on an eminence on Cherso island and close to Lussin island, and where a swing-bridge forms a communication between the two. Here the beautiful white limestone which has been so largely employed at Venice is quarried. Water and provisions are scarce, but may be obtained.

**Camisa Bay** is in Ossero channel, on the coast of Cherso, and nearly three miles northward of the town. The water is deep, but there is anchorage for small vessels in the northern part of the bay, in about seven fathoms, muddy bottom.

The passage between Cherso and Lussin islands is only 13 feet wide, abreast of the town of Ossero, with a depth of little more than three feet. A strong fort defends the narrow passage, which can be taken only by vessels of very light draught, and by the withdrawal of the bridge. The two shores gradually diverge southward, leaving a southern entrance three miles wide.

**LUSSIN ISLAND** consists of elevations united by low stretches of land, and at a distance presents the appearance of three islands. It is  $16\frac{1}{2}$  miles in length in a NNW. direction, and its breadth varies from about a half to nearly three miles, its coast line being broken and irregular. The N. part is hilly and barren, and nearly three miles from this end is mount Ossero, in the form of a cone, 1,909 feet above the sea, and which is one of the principal objects in this part of the Adriatic. Mount Calvario, 745 feet high, which has a church on its summit, is near the S. part of the island, which generally is well cultivated, and contains the greater portion of the 12,000 inhabitants of the island. Here many flocks, the wool of which is exported, find pasture, and the vine and the olive are grown in abundance. The water is generally deep around the island, and the coast mostly high and of irregular outline.

**Ossero Point**, the N. extreme of Lussin island, has a sunken rock off it with deep water close to; the point should not be passed too close. The bold coast of the island then trends southward, with deep water off it for nearly  $7\frac{1}{2}$  miles to Carbarus islet or rock, which is connected to the shore by shoal water; the coast thence southward, round Gorila point, the SW. extreme of Lussin, is bordered by a narrow bank. Bianca point, a mile southeastward of Gorila point, is bold, and  $1\frac{1}{2}$  miles farther eastward is the entrance to port Lussin Piccolo.

**PORT LUSSIN PICCOLO** is a long narrow inlet at the least elevated and most contracted part of the island, the entrance being about five miles to the ENE. of Sansego island, and commanded by a fort facing it on an elevation 286 feet above the sea. The port is about 600 yards wide, extends nearly three miles in a NW. and SE. direction, without any dangers, and is considered one of the best and most conveniently situated harbors in the N. part of the Adriatic. Vessels anchor in any part of the inlet, in six to 23 fathoms, good holding ground, but the NE. side, not far from the outer houses of the town, is usually preferred on account of the bora. There is also anchorage in the NW. part of the inlet. Close proximity to the rocky NE. shore of Koludarz islet, and also to the NE. shore of the port abreast of the outer houses of the town, should be avoided.

The town of Lussin Piccolo, at the SE. end of the inlet, contains a population of about 3,500. There is very little cultivation in the vicinity, and what there is requires the protection of numerous stone walls, as the bora blows frequently with great violence during the winter months. There are building yards for small vessels, the wood being brought from the coast of Dalmatia and elsewhere. Steamers call three times a week with the mails to and from Trieste and Corfu. The town is connected by electric telegraph to Cherso, and thence to the Istrian peninsula. A storm-signal station is established on a hill about three-quarters of a mile to the NW. of the town.

Water and small supplies of provisions may be obtained.

**LIGHTS.**—At the W. end of Mortar islet, on the S. side of the passage to port Lussin Piccolo, is a *fixed* light at an elevation of 38 feet above the sea, visible eight miles. The light is *red* when bearing from seaward between NNW.  $\frac{5}{8}$  W. and NE. by E.  $\frac{1}{8}$  E.; and white between NE. by E.  $\frac{1}{8}$  E. and SSE.  $\frac{3}{4}$  E. The light is exhibited from an iron column, with a red and white globe on it, upon the keeper's dwelling.

On the N. extreme of Koludarz islet, on the S. side of entrance to port Lussin Piccolo, is a *fixed green* light, visible two miles.

A *red* light is also shown from the town of Lussin Piccolo through an arc of  $50^\circ$  towards the direction of the port.

**Tides.**—It is high water, full and change, at port Lussin Piccolo, at 8h. 26m.; and the rise is about one foot.

**DIRECTIONS.**—When bound to Lussin Piccolo, the lowest part of Lussin island should be steered for, and on a near approach, the town, which is on an eminence at the SE. part of the port, will be plainly seen. The passage between Zabodacki (50 feet high) and Mortar islets should be taken, and then through the entrance of the inlet, which is about 400 yards wide, between the NW. extreme of Koludarz islet and the bluff

**Artatorre point.** Mortar islet is connected to Koludarz islet by a bank with two fathoms water on it. The space between the SE. extreme of Koludarz islet and the point of Lussin island which forms the port is called Bocca falsa (false entrance), being closed by a reef of rocks.

The outside channels are all wide and clean, except between Unie and Canidole islands; near the S. extreme of the former is a sunken rock; but there is a good passage by keeping nearer Great Canidole.

**Torre Cove.**—Temporary anchorage may be taken in this cove between Zabodacki islet and Artatorre point, when the bora prevents entrance to Lussin Piccolo. But care must be taken to leave it before being detained by southerly winds, to which it is quite exposed.

**Port Cigale** is a well sheltered little bay two miles from the entrance to port Lussin Piccolo, and  $4\frac{1}{2}$  miles from the SE. extreme of Lussin island; it is frequented by coasting vessels. It extends inward a short half mile, and its entrance, which is not quite 300 yards wide, is open to the westward. The depth is nine to 12 fathoms, in the middle of the port. There is a health-office here, and the distance across to Lussin Piccolo is only about half a mile. There is a chapel on the starboard point of entrance as well as an iron stand for the light.

**LIGHT.**—At Annunziata point, on the S. side of entrance to port Cigale, a *fixed green* light is exhibited at an elevation of 35 feet above the sea, visible six miles.

**UNIE ISLAND** is the westernmost of the Quarnero islands, and forms with the coast of Lussin, a deep channel, from  $2\frac{1}{4}$  to  $3\frac{1}{2}$  miles wide. The island is five miles in length N. and S., a little more than a half to  $1\frac{1}{2}$  miles in breadth, and irregular in shape; its elevations are from 240 to 408 feet above the sea, the highest hills being towards its extremities, and the latter height to the southward. The low parts of the island are covered with grass and brushwood. It has about 500 inhabitants, produces good firewood, and has a considerable fishery.

**Port Unie.**—This bay on the W. side of Unie island, is about half a mile wide at the entrance, about the same deep, open to the NW. and affords temporary anchorage for moderate size vessels. The best berth is in nine fathoms, sand, northeastward of the islet off Nard point, the S. side or entrance; here there is shelter from all winds from the eastward. The S. side of the bay is bordered by shoal water, within which is the islet, which continues along the shore to the S. point of the island.

**LIGHT.**—On Netak point, the SW. extreme of Unie island, and nearly a mile southward of port Unie, is a light-house, which exhibits at 56 feet above the sea, a *fixed white* light, visible in clear weather from a distance of 12 miles.

**Anchorage.**—There is good anchorage in Bruglie bay, on the SW. side of Unie island, in about 15 fathoms water, with Netak point light-house bearing about NW. by N. two-thirds of a mile, and the same distance from the shore, sheltered from N. and easterly winds.

**Port Lungo.**—On the E. side of Unie island are three bays, named ports Lungo, Mezzo, and Fogon; they are exposed to SE. winds, which send in a considerable sea, but afford anchorage against westerly and northwesterly winds.

**CANIDOLE ISLANDS.**—These two islands are connected by a three-fathoms ridge, and together are nearly three miles in length in a NW. direction. and about a third of a mile in breadth. The northern island, called Great Canidole, is twice the length of the other, and 153 feet high; the southern island, called Little Canidole, is 122 feet high, and has a small islet or rock about 400 yards off its S. end. The islands are partly wooded, and the water is deep all round them.

These islands are separated from the S. end of Unie island by a passage a little more than three-quarters of a mile wide, with 12 fathoms water in the middle.

A vessel taking this passage should avoid a small rock awash, nearly 400 yards from Arbit point, the S. extreme of Unie, with a five-fathom patch outside it, by keeping nearer Great Canidole island.

**Anchorage.**—Shelter may be obtained from a bora, at a short distance southwestward from the Canidoles, in 20 to 22 fathoms, sandy bottom.

**UNIE CHANNEL.**—The large and nearly land-locked space, between Unie and Lussin islands, affords a safe refuge to numerous fishermen of this part of the Adriatic, who affirm that a large fleet might here ride out a gale of wind in complete security. The soundings are very regular; about 24 to 26 fathoms, sand and mud bottom.

**GALIOLA ISLE.**—This small, low, rocky islet lies five miles NW. by W.  $\frac{1}{2}$  W., nearly, from the N. extreme of Unie island, and is surrounded by shoal water. On it is a white octagonal light-house, 69 feet high, rising from the keeper's dwelling, which has a flat top.

**LIGHT.**—The light-house on Galiola isle exhibits at 71 feet above the sea a *red* light showing a *flash* every *half minute*, and visible 11 miles.

**GREAT QUARNERO CHANNEL.**—This channel, formed by the E. coast of Istria on the one hand, and Cherso, Lussin, Unie and Sansego islands on the other, is of safe navigation with reference to rocks and shoals. The narrowest part, between Nera and Zaglava light-houses, is  $6\frac{1}{2}$  miles wide, and the water is everywhere deep between them. At night the above lights, together with those of the Porer rock,

and Galiola islet on the S. afford the seaman every facility for ascertaining his position.

The bora is often very violent and dangerous in this channel, and vessels are obliged to bear-up for shelter under cape Promontore, or for one of the ports in the neighborhood, or if necessary to anchor at once wherever they happen to be. This wind undergoes remarkable shifts; northward, it usually follows the direction of the channel; towards the middle it veers to the eastward, and it generally becomes northerly again as the shore of Cherso is approached.

The Current is very rapid at the narrowest part in northerly winds, when it sometimes attains a speed of four miles an hour. During the flood it sets to the northward along the coast of Cherso, and to the southward along the shore of Istria; during the ebb, the direction throughout the channel is southerly.

**SANSEGO ISLAND.**—This is the south-westernmost of the Quarnero islands; its S. point is 31 miles from Bianche point light-house of Grosso island, and 24 miles from Porer light-house (cape Promontore), and is usually made by vessels on their way to sight cape Promontore before proceeding northward. Its height (mount Garbe) is 307 feet above the sea, and crowned by a church; it appears flat at a distance, and has a sandy soil. On the eastern slope, near the middle of the island, are a village and a church. There are about 250 inhabitants on the island; wine and fruit are the chief products.

The coasts are steep, and of bold approach, except the points, near which the water is shallow; the island is somewhat in the form of a triangle with its base to the SE. Rocky patches with from six to nine fathoms water on them lie from a half to rather more than two miles from the NW. end of the island, and although the least known depth is six fathoms, it is advisable to keep clear of them to avoid the heavy sea, and which occasionally breaks. A rocky patch, with 11 fathoms on it, lies about two-thirds of a mile westward of the S. point of the island.

**Dragazoul cove**, which is suitable for small vessels only, is on the NE. side of the island, but open to the N. and eastward.

**ANCHORAGE.**—Vessels anchor 1,000 and 1,200 yards from the SW. shore of the island in 19 fathoms, sandy bottom, with Sansego village bearing about ENE. This anchorage is useful in a bora gale.

**LIGHT.**—A *flashing* white light of the 4th order, visible 20 miles, is exhibited from the top of a wooden tower 36 feet high covered with tiles. This tower is on the summit of mount Garbe, island of Sansego, and is 341 feet above the level of the sea.

Position: Latitude  $44^{\circ} 30' 56''$  N., longitude  $14^{\circ} 18'$  E.

**ASINELLO ISLAND**, to the SE. of Lussin, is about  $2\frac{1}{2}$  miles in length, a mile in breadth, 298 feet high, with an irregular shore; on its NE. side is the village of St. Pietro di Nembro. Radovan point, the SE. extreme of the island, is easily recognized, being long, low and whitish. At a mile westward of the point, a shoal projects from the shore, with from one to three fathoms water on it.

**PORT ST. PIETRO DI NEMBO** is between the island of the same name, which covers the village, and lies on the NE. side of Asinello. The port thus formed is narrow, being less than 400 yards in breadth, but more than a mile in length, with from two to five fathoms water. The SE. passage is the better of the two when the wind is favorable. The anchorage, which is fit only for small vessels, is abreast of the ruins of a fort on the shore of St. Pietro di Nembo. In taking the NW. passage, which is indicated by a church near some white cliffs on the port hand, mid-channel should be preserved, as the water on both shores is shoal.

Water may be obtained at the village, and also near the ruins of the fort.

The island of St. Pietro di Nembo is bold, 223 feet high, more than a mile in length, woody, with a church near its W. end, which is a long half mile from Lussin. The islet of Cosiach, 112 feet high, lies between St. Pietro di Nembo and the SE. end of Lussin, leaving a narrow, clear channel midway on either side of it for small vessels, but the current is too rapid to permit the passages being taken without much caution.

**GRUIZZA ISLET.**—This small islet lies S. by W.  $1\frac{3}{4}$  miles from Radovan point of Asinello, and has a white light-house on it; it is bordered by a bank, which extends northward more than 200 yards.

At nearly two-thirds of a mile northward of the islet, between it and Asinello, is the centre of Gruizza bank, with  $3\frac{1}{2}$  and four fathoms water; the bank is nearly three-quarters of a mile in extent within the 10-fathoms line of soundings, and elsewhere has from seven to nine fathoms on it. Between it and Asinello island is a patch with  $5\frac{1}{2}$  fathoms water.

**LIGHT.**—The light-house on Gruizza islet exhibits at 56 feet above the sea a *fixed* white light, varied by a *red flash* every *minute*, and should be seen in clear weather from a distance of 12 miles.

**SELVE BANK.**—The passage between Gruizza islet and Lutostrak islet off the N. end of Premuda island, is  $2\frac{1}{2}$  miles wide and clear of danger, except the Levante bank. This bank has five fathoms water on it, and lies  $1\frac{1}{2}$  miles SE. by E.  $\frac{3}{4}$  E. from Gruizza islet, and may be avoided by keeping either side of the passage aboard.

The Selva bank is nearly half a mile in extent, with one fathom on the shoalest part, which is marked by an iron staff surmounted by a

skeleton ball and vane 13 feet above the sea. On other parts of the bank there are from six to nine fathoms. The shoalest part lies NE. by E.  $3\frac{1}{2}$  miles nearly from Gruizza light-house, and NNW. from the W. extreme of Selve island.

Both of these banks lie in the fairway to the Quarnerolo channel; the Selve may be avoided by keeping the Gruizza light-house well clear of a SW. by W. bearing, though in passing southward of Selve, a WSW. bearing would lead on to the Morovnik bank, which has only two fathoms on it, but seven miles nearly from the light-house.

**ANCHORAGE.**—The Oriole are two rocky islets nearly united and together not quite two miles in length; the northern of the two is 90 feet high, and they are called the Great and Little Oriole; they lie half a mile eastward of the SE. extreme of Lussin. There is good anchorage between them and Lussin, in 22 fathoms, mud and sand, sheltered from the bora. Both the NW. and SE. passage are clear of danger. A rocky shoal awash, lies nearly 600 yards eastward of the N. part of the southern islet.

**LUSSIN CHANNEL.**—The E. coast of Lussin island is irregular, mostly high, and forms, with the S. end of Cherso, Lussin channel. The two shores at the SE. end of the channel are about  $3\frac{1}{2}$  miles apart and gradually converge to about four yards abreast the town of Ossero, in Cherso, a distance of seven miles. The water, from the depth of 38 fathoms at the entrance, shoals gradually to the upper part of the channel, the bottom throughout being mud. The channel is too much exposed to southeasterly winds and sea for safe anchorage, but small vessels anchor at Martincica, Caldonte, port Santo and other small places. The passage from Lussin channel, between the two islands, to Ossero channel on the N., carries only about three feet of water.

**Lussin Grande.**—The village of this name, on a hillock, points out the position of a little bay on the E. coast about  $2\frac{1}{2}$  miles from the S. end of Lussin island, which is open to the NW., and has sufficient space for small vessels. Northerly and easterly winds occasion a heavy sea at the entrance.

**CROCE POINT.**—The S. end of Cherso island is about  $2\frac{1}{2}$  miles across, slopes gradually southward with a rugged and irregular coast line, forming several small bays or inlets, the points of which are bordered by shoal water. Croce point, the central projection, is low, and on the E. side of port St. Andrea, which alone has sufficient space for small vessels.

**Oruda Island.**—At about four miles to the SE. by S. of Croce point is the island of Oruda, two-thirds of a mile in length, and 34 feet high; and beyond is the islet of Palazziol. These are connected and sur-



rounded by shoal water, and at a mile E. of Palazziol is a sunken rock, which is marked by an iron staff surmounted by a ball.

**Craljetto Rock.**—Numerous shallow rocky patches extend three miles to the NW. by N. of Oruda island, with deep water between them, and in the middle is a sunken rock, named Craljetto. The above islands and dangers should be given a wide berth.

A beacon buoy lies on the northern edge of the shoal patches, which should be left to the southeastward in passing between the dangers and Croce point. The buoy is surmounted by an iron cage and ball painted white, and lies in  $22\frac{1}{2}$  feet water, with fort Asino bearing WSW.  $\frac{5}{8}$  W., Terstenik light-house N. by E.  $\frac{5}{8}$  E., and Oruda island SSE.  $\frac{1}{4}$  E.

**Terstenik Island**, three-quarters of a mile in length, with a light-house on its highest part, lies about  $2\frac{1}{4}$  miles to the northeastward of Colorat point of Cherso island.

**LIGHT.**—The light-house on Terstenik island, exhibits at 88 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 14 miles. A sector of 11 degrees of *red* light is shown in the direction of the navigable passage between the S. end of Cherso island and the dangers extending to the NNW. of Oruda island.

**East Coast of Cherso.**—At  $5\frac{3}{4}$  miles NW.  $\frac{1}{4}$  W. from Terstenik island and a mile from the shore of Cherso, is the little islet of Sciutin. Between the islet and the shore is a shoal with  $3\frac{1}{2}$  fathoms water on it; and three-quarters of a mile southward of the islet, and a mile from the shore, is a shoal half a mile in length, with two fathoms on it. Thence northward along the E. coast of Cherso, through Corsia and Veglia channels, there are no outlying dangers, and the chart must be the guide.

**Coromazza Bay**, about three miles N. by W. of Sciutin island, affords shelter for vessels from NW. and SW. winds. It is about a mile and a half wide at the entrance and a mile deep. The anchorage is in from 12 to 20 fathoms.

**Chrustiza Cove**, nine miles farther N., can be used as a temporary shelter by small vessels.

**VEGLIA** is the most northern and the largest of the Quarnero islands, being somewhat triangular in form, 20 miles in length, with an extreme breadth of 11 miles, and only second to Lissa in number of inhabitants, which are estimated at about 18,000, and is superior in its variety and abundance of produce. Of the various elevations, mounts Orliach, 1,763 feet above the sea, and Triskovac, near the southeastern extreme, and mount St. Giorgio, 1,063 feet, near the NE. coast, are the most remarkable, the greatest heights being towards the SE. end. The SW. part is lower and more fertile than the opposite, but a great por-

tion is covered with woods. The island is noted for a peculiar breed of small and active horses. The gentle slopes of the higher parts afford pasturage which is highly esteemed; the wine is the best produced in the Quarnero, and the olive and various fruits grow luxuriously.

The N. coast is high, rugged and of whitish appearance, excepting northwestward, between Pelova point and Sottile point of Castelmuschio bay, where patches of cultivation alternate with woodlands. The country in the neighborhood of Veglia town on the SW. is well cultivated and of agreeable aspect, as is the S. coast generally; near the SE. extreme it is rocky and barren.

**VEGLIA BAY**, near the middle of the SW. coast, affords anchorage for vessels of any size, in five to 11 fathoms, muddy bottom. Violent bora squalls reach it from the elevated valleys of mount Triskovac, and it is advisable to anchor under the SE. shore, off Caneve cove, and to take every precaution against this wind.

**The Port of Veglia**, in the NW. part of the bay, is merely a creek, in which large boats or vessels of very light draught are protected, by a mole, from southerly winds; the depth in the middle is little more than six feet.

The town of Veglia is on an eminence; it contains 4,500 inhabitants, has a cathedral and several other important buildings, and is defended by walls and a castle. It is the chief place of export for the produce of the island. There is a telegraph station here, the island of Veglia being connected to the main at Spassaz, near Zengg, and to Cherso by cable from Grego-morte bay on the W. side of the island; also, with Arbe island. Spring water may be obtained.

**Plaunick Island** is about three miles in length,  $1\frac{1}{4}$  miles in breadth, and 624 feet high. Its shores are generally bold with the exception of the E. end, where shoal water extends off more than half a mile, and beyond this again are the two Cormato islets, 30 feet high.

Plaunick island forms with the coast of Cherso on the W. Corsia channel, which is clear and deep, and half a mile wide.

**Dangers.**—The N. point of Plaunick island is  $1\frac{1}{4}$  miles from the coast of Veglia, and between there are no dangers and the soundings deep; but between the island and the shore of Negritto point of Veglia, are three shoals: Pitic shoal, with two fathoms water on it, lies about three-quarters of a mile N.  $\frac{3}{4}$  E. of the SE. end of the outer Cormato islet; at nearly the same distance farther N. is the Bondenegrutto, with  $3\frac{1}{2}$  fathoms; and half way between Plaunick island and the shore of Veglia bay is the But shoal, with four fathoms. These dangers have deep water around them, and can be avoided by keeping the coast of Veglia aboard.

**LIGHTS.**—On the mole head at Port Veglia is a small stone tower,

from which is exhibited, at 23 feet above the sea, a *fixed* white light, seen in clear weather from a distance of nine miles.

At Negritto point, the SE. extreme of Veglia bay, is a *fixed red* light 42 feet above the sea, and visible nine miles. The light is exhibited from an iron framework attached to the keeper's dwelling, which is white and close to the shore.

**Cassion Bay**, in the NE. part of Veglia bay, is only frequented by small craft to load with firewood, the passage leading to it being narrow and having a depth of little more than one fathom. It is well protected, being nearly land-locked.

**CAVLINA ANCHORAGE**.—Vessels may anchor in Cavlina bay on the NW. coast of Veglia, northward of Santa Maria or Such point. Large vessels should come to, at about 800 yards from the shore, in 25 fathoms, good holding ground. This anchorage is well protected from southwesterly winds by Cherso island, and is exposed to those from northward and westward only.

The monastery of Santa Maria stands on the SW. point of the bay.

**Malinska Road** is close to the eastward of Pelova point. Vessels of large draught anchor between two small creeks protected by moles, one on each side of the bay, in 19 fathoms, mud, and about 600 or 800 yards from the shore. Smaller vessels, which draw too much water to enter inside the moles, anchor nearer the beach. Northwesterly winds are troublesome, but although they sometimes occasion a considerable sea they are not dangerous at this anchorage. Water may be obtained at Malinska village.

**LIGHT**.—A *fixed green* light is exhibited from a lamp post on the mole head at Malinska, at 19 feet above the sea, visible five miles.

**Sasso Bianco Road**, northward of Malinska, is also exposed to northwesterly and southwesterly winds. The anchorage is in about 10 fathoms, muddy bottom, abreast of the small village of Gnivice.

The high, rounded and wooded Pelova point, is a good mark for both Sasso Bianco and Malinska bays.

**CASTELMUSCHIO BAY**, near the northern extremity of Veglia, is protected by the low, narrow peninsula terminating in Sottile point, which projecting  $1\frac{1}{2}$  miles to the northward, forms its western side. It has a depth of 29 fathoms in the middle of its entrance, and the soundings decrease to 14 fathoms opposite the village at the head of the bay; on the E. side the space is sufficient for a number of vessels of the largest size, but the bora is sometimes severely felt at this anchorage.

A shoal extends northward from Sottile point on the starboard side on entering, and should not be approached within 400 yards.

At about half a mile within the point on the E. side of the entrance

to Castelmuschio is port Lucizza, which is preferred to the latter by small vessels, which anchor in about seven fathoms, securing to the shore against the bora.

Both points of the bay eastward of Castelmuschio are bordered by reefs, and should not be approached too close.

Water and small supplies of provisions may be obtained at Castelmuschio bay.

**St. Marco Islet** is a barren rocky islet, 342 feet high, and close to the N. extremity of Veglia island; it divides the entrance of the passage to Maltempo channel, between Veglia and the Hungarian coast into two passages. The southern passage, between St. Marco and Veglia is too narrow unless for small vessels under favorable circumstances; the passage between the islet and the coast is about a quarter of a mile wide, with depths of 32 to nine fathoms, and is without hidden dangers.

**Anchorage.**—There is a depth of seven fathoms, mud, in a little bay between St. Marco islet and a small rocky peninsula, near the northern extreme of Veglia. Vessels anchor in the center of the bay, and lay out a cable to the peninsula, where there is a village and a church. This anchorage is useful to vessels overtaken by a bora gale after entering Maltempo channel from the westward.

**MALTEMPO CHANNEL.**—This channel is formed by the coast of the mainland southward of Porto Re on one side, and the island of Veglia on the other, and is the northern portion or continuation of the Morlacca channel. It derives its name from the fury with which it is assailed by bora gales. It is very narrow between St. Marco islet and the mainland, the currents are always rapid, and the only places of shelter are some coves on the Hungarian shore; between Porto Re and port Segna or Zeugg the coast is barren and precipitous. Novi town, on the Hungarian frontier, is the only remarkable object. Water may be obtained at Novi.

**LIGHTS.**—At Dubnin point, on the mainland E. of St. Marco islet a *red* light is shown from an elevation of 72 feet above the sea, visible two miles.

At Voschizza, Veglia island, a *fixed* white light is exhibited from an elevation of 31 feet above the sea, visible eight miles.

At Ertac point, on the mainland, a *fixed green* light is shown, visible two miles.

**Dobrigno Bay.**—This bay, on the NE. coast of Veglia, and about six miles from its N. extreme, affords excellent shelter for vessels drawing less than two fathoms, which is the general depth in the bay. A shoal with six feet water on it, lies about a quarter of a mile outside the N. point of entrance to the bay, which should be carefully avoided.

**ZUPANI BAY.**—The NE. coast of Veglia is swept by the bora, and, although there are several small indentations called ports, this bay is the only refuge from this wind for any other than vessels of very light draught. It is about  $1\frac{1}{2}$  miles southward from Dobrigno bay, and is protected by the long narrow tongue of land forming Sillo point. It is advisable to anchor in 15 to 17 fathoms, muddy bottom, near the E. side of the bay, and with a cable to the shore northeastward. Sillo point is foul, and half a mile southward of it, a shoal with  $2\frac{1}{2}$  fathoms on it, extends off a quarter of a mile.

At **Verbenico**, a small town on the E. coast of Veglia island, about five miles S. of Sillo point a *fixed* white light is exhibited from the end of the mole when the mail steamer is expected. The light is shown from an iron lamp-post 13 feet high and 18 feet above sea level.

**LIGHTS.**—On the southern mole at Cerkenizza, on the mainland, a *fixed red* light is shown from a lamp-post, visible four miles.

At Selze, also on the mainland, a *fixed* white light is exhibited at an elevation of 39 feet above the sea, which should be seen at a distance of 12 miles.

Also, a *fixed green* light is shown from the pier head, visible four miles.

At the little port of Novi, on the mainland, a *red* light, visible two miles is shown from the mole head.

The coast of Veglia island between port Verbenico and New Besca bay is steep-to. Kanenik rock lies N. of Veligrad point distant 300 yards.

**Velaluka Bay.**—This narrow inlet lies W. of Sokol point, is about a mile deep and affords anchorage for small vessels.

**New Besca Bay**, at the SE. extremity of Veglia, is completely exposed to winds from the SE., and is seldom visited except by small coasting vessels and boats for water and vegetables, of which there is an abundant supply. The land in the vicinity of the village is highly cultivated. A shoal awash extends off from the S. point of the bay.

**Pervicchio Island**, about half a mile from the SE. extreme of Veglia, is about four miles in length NW. and SE.,  $1\frac{1}{2}$  miles in breadth, 1,150 feet high, hilly and barren; a rocky shoal extends off about a quarter of a mile from the middle of the W. side. The passage between it and Veglia is called the Bocca di Segna, and is used by vessels bound to port Segna, on the coast of Croatia. Mid-channel should be preserved, as shoals extend from the two points of the islands which are nearest each other.

The bora often blows through this passage with extreme violence, and it is advisable when under sail to reduce it before entering, and to

seek shelter under the lee of Veglia island at the least indication of this wind approaching.

**LIGHT.**—On the NW. extreme of Pervicchio island, is a dwelling of reddish stone, one story high, from which is exhibited at 67 feet above the sea a *fixed* white light, visible 10 miles.

**PORT SEGNA.**—This little port, on the mainland opposite the southeastern part of Veglia, is formed by two moles, and is protected from southerly winds by the point upon which the town is built; it is exposed to northwesterly winds. Every precaution should be taken against the bora, which is severely felt here; the holding ground is not good. Vessels at times prefer anchoring under Arbe island to being exposed to bora gales at port Segna. It often happens that while a heavy bora is blowing at Segna, a calm or a light breeze prevails five or six miles seaward.

The town of Segna or Zengg, which is close to the shore, is partly built upon a hilly point, which juts out to the westward, and is commanded by a large fort 280 feet high. It is one of the few much frequented commercial places of Croatia, and has about 7,500 inhabitants. Zengg exports the building timber of the Croatian forest, and the corn and tobacco of Hungary. A telegraph station communicates with the islands. Water and provisions, and materials for slight ship repairs, can be obtained.

The approach to port Segna is through the Bocca di Segna, which has been already described. Vessels from the SE. should sight the *red* light before entering the port, but in bad weather the light cannot be shown.

**Tides.**—It is high water, full and change, at port Segna at 8h. 25m., and the rise is  $1\frac{1}{2}$  feet.

**LIGHTS.**—At the NE. mole, port Segna, at an elevation of 27 feet above the sea, is a *fixed* white light, visible in clear weather at a distance of 12 miles.

A *red* light is shown from the SW. mole, visible four miles.

**Sezza Island.**— $2\frac{1}{2}$  miles W.  $\frac{1}{2}$  N. from Zengg and  $1\frac{1}{2}$  miles N. by E.  $\frac{1}{2}$  E. from Sokol point, is barren, about 300 yards long and steep-to. There are no outlying dangers around it.

**MORLACCA CHANNEL**, in continuation of Maltempo channel from the N. embraces the coast and islands bordering it as far southward as Montagna channel, leading to Mare di Novigrad.

The long chain of elevated mountains, which rise about a quarter of a mile from the sea, occasions violent bora squalls, which render the navigation dangerous, especially as the channel affords scarcely any tolerable anchorage. The coasting vessels which use the channel on their

way to Segna, Carlobago and Novigrad keep close to the shore, so as to be within reach of the various coves and creeks formed by it, and never remain under way at night during the bad season.

For the course or trend of the channel and the positions of the few existing outlying dangers, the seaman is referred to the chart.

**Lukovo.**—Between port Segna and Carlobago the coast is steep and rocky, and affords little shelter. Small vessels may anchor for shelter abreast the town of Lukovo, at about 200 yards from the shore, to which it is customary to make fast. Water may be obtained from a fountain close to the shore, about a mile northward of the anchorage.

**Gregorio Islet**, two miles southwestward from Pervicchio island, is barren,  $2\frac{1}{2}$  miles in length, 750 feet high, and steep-sided. In case of emergency, a vessel may anchor for shelter from easterly winds, in Gregorio bay on the NW. side, in about 16 fathoms, muddy bottom.

**Goli Islet**, which is nearly a mile southeastward of Gregorio, is  $1\frac{1}{2}$  miles in length and 760 feet high. Shoal water extends some distance from its NW. point, and an islet, rocks, and shallow water extend off half a mile from its S. point. A vessel may anchor during a bora gale to the southward of Goli close to the mainland.

**ARBE ISLAND.**—This island is 12 miles in length, varying in breadth from  $1\frac{1}{2}$  miles at its southern part to about six miles at the northern; the coast line of this latter part is irregular and has deep indentations or bays. A chain of hills, the highest of which, mount Tinjarossa, 1,426 feet above the sea, near the center, extends throughout the entire length from NW. to SE. There are about 6,000 inhabitants, and it is one of the most important of the Quarnero group. The products are wheat, wine, olives, silk, and firewood, and a great number of sheep and cattle are reared; there are marble quarries. Excellent wine is produced at Barbato, near the SW. end of the island. Arbe is connected to Veglia by telegraphic cable, and also Fracagno point; port Arbe, to San Martino, Pago island.

**Port Arbe**, at about the middle of the SW. coast, has an area of nearly 500 yards in length, and rather less than 200 yards in breadth, with from a half to two fathoms water, and sheltered from all winds by a mole which protects its entrance. Arbe town is pleasantly situated on the little projection, which forms the SW. side of the port, and shelters it from southwesterly winds. It is the center of the commerce of the island, and contains a cathedral and a collegiate church. In the neighborhood are some salt-works.

The entrance to the port is between the town and Tonera islet, 350 yards to the SW. The islet is 200 yards in extent, 31 feet high, and connected to the mainland by shoal water; a breakwater, six feet in breadth

and six feet above the sea, projects eastward from the islet towards the end of a similar breakwater from the shore, leaving an opening 20 feet wide for boats.

A small *red* light is shown from the head of the mole at the entrance of the port.

Westward of the town a tongue of land projects to the SE. parallel to the shore, and forms a narrow inlet more than a mile deep, named Eufemia cove, within which there is anchorage in  $3\frac{1}{2}$  to 10 fathoms, muddy bottom.

**Dolin Island** is a long narrow strip of land running parallel for more than  $4\frac{1}{2}$  miles, with the SW. coast of Arbe island, the space between being called Barbato channel. Dolin island is 175 feet high at the NW. end and 394 feet high at the SE. end, and thickly covered with bushes.

The long channel thus formed between the two shores has an average width of about 400 yards, and the depth in the middle varies from seven to 13 fathoms, sand; the bottom near Dolin is rocky. It affords an excellent well sheltered anchorage for a considerable number of vessels in three places: first, about two-thirds of a mile within the NW. entrance, which is the widest part of the channel; secondly, a little to the SE. of the small church of St. Stefano, where the shore of Arbe is bordered by a sand-bank; and thirdly, at about two miles from the SE. end of Dolin island. It is customary to anchor mid-way between the two shores, and lay out a cable to the shore northeastward.

There is a fountain with an abundant supply of water a short distance to the eastward of St. Stefano church.

**Directions.**—The distance between Fracagno point, the termination of the tongue of the land on the NW. forming Eufemia cove, and the extremity of Dolin island on the SE. is three-quarters of a mile; the passage to port Arbe or to the other anchorages is between the two points. Fracagno point should not be approached too closely in a vessel of heavy draught; at 350 yards to the SE. of it is a rocky shoal with a beacon on it; beyond this shoal or nearly mid-way between it and the NW. end of Dolin island is a two-fathom patch; the water between these dangers is deep.

The beacon on the rocky shoal is a truncated cone with an iron staff and ball; the deepest water between this shoal and Fracagno point is in mid-channel, or rather nearer the shoal.

To avoid the two-fathom patch, a vessel should pass just S. of the Beacon shoal, or about 200 yards N. of Dolin point.

In taking the SE. entrance to the Barbato channel, the Cantarara rocks off Dolin island must be left on the port hand, and a rock with



about four fathoms of water over it, which is united to Arbe by a rocky shoal, should be left on the starboard hand.

A rocky bank with  $2\frac{1}{4}$  fathoms on it lies about a third of a mile from the SE. shore of Arbe.

**Port Omago** is a small inlet open to the N. at the eastern extreme of Arbe island, and affords convenient shelter to small vessels overtaken by a bora gale in the Morlacca channel. Rocks above water extend along 200 yards northward from the point of entrance, and about half a mile farther N. is the islet of Lukovaz, a quarter of a mile from the shore, with shoal water extending from its N. end. In the port the water is seven to nine fathoms deep, and the bottom mud.

**Bilibrach Shoal**.—This danger has  $5\frac{1}{2}$  fathoms water on it, and lies  $1\frac{1}{2}$  miles NNW.  $\frac{1}{4}$  W. of Lukovaz islet, and rather more than half a mile from the shore of Arbe island. The E. extreme of Arbe island kept open eastward of the above islet leads clear of it.

**Coast**.—From port Omago the NE. side of Arbe island is nearly straight in a NW. direction, and is an exposed iron-bound coast until near its NW. end, when it trends eastward and round by N. to W. to its termination. From the bight where it turns eastward, the coast is broken and irregular, bordered here and there with shoal water and rocks, and leaving between it and Gregorio islet a deep passage about a third of a mile wide, but which is never used.

**Loparo Bay**, the most eastern of the harbors on the N. end of the island, is a well sheltered anchorage from all winds except NW. A good berth should be given to Belibric shoal on the eastern side of the bay. This anchorage is not much used and is not recommended, the preference being given to one of the bays SW. of it.

**Port St. Pietro** is at the NW. end of Arbe island. It is open to the NW., but otherwise is well sheltered from all winds, and has a depth of 14 fathoms abreast of the health-office on the NE. side, at a convenient distance from the shore for laying a cable to it.

The shore of mount Sorinjo should be closed on entering this port, and the SW. side of the bay, which is bordered by shoal water, should be avoided. There are two good springs close to the beach.

At 800 yards off Sorinjo point, the NW. extreme of Arbe island, is a four-fathom patch, with deep water between it and the point. This danger should be avoided in large vessels.

**Kampora Bay** is southwestward of port St. Pietro, to which it is inferior. The best anchorage is in 10 or 11 fathoms, muddy bottom, off the village, which is on an eminence on the port hand going in. The NE. side of the bay should not be closed, as there is a rock awash and the shore is bordered by shoal water.

**Anchorage.**—Between cape Fronte on the W. side of the island and the town of Arbe the coast is broken and forms several coves, where coasting vessels load with firewood under shelter from the bora. These places are also resorted to for temporary refuge from this wind by ordinary merchant vessels. There are one or two patches with three to four fathoms water on them, near the shore, for which, refer to the chart.

**Laganj and Dolfin Islets.**—These two barren islets, each about half a mile in extent, are about  $1\frac{1}{2}$  miles apart, but almost connected by rocky shoals, and together they extend over a space of nearly  $2\frac{1}{2}$  miles. Laganj, the northern islet, is 30 feet high; a rock or smaller islet lies off its S. end, and banks with from six to 10 fathoms water on them extend  $1\frac{3}{4}$  miles to the NW. by N.; this islet is  $2\frac{3}{4}$  miles from Arbe island. Dolfin islet is 90 feet high; it has a rock awash off its N. end and a large rock off its S. end, where the islet is surrounded by a bank with  $5\frac{1}{2}$  to 10 fathoms on it; this islet is about WSW. two miles from the N. extreme of Pago. Small vessels occasionally anchor about 400 yards from the SW. side of Dolfin islet for temporary refuge against a bora.

**QUARNEROLO CHANNEL.**—This channel, the largest expanse of water within these islands, is bounded on the N. by Veglia and Planick islands; on the W. by Cherso, Lussin and Asinello; and on the E. by the several islands bordering the mainland. The chief and the most frequented of the southern entrances to it from the open sea is between Asinello on the N. and Premuda and Selve islands on the S.; the second in importance is between Selve and Ulbo; and the next between the latter and Pago islands, which is taken by vessels bound to Zara channel.

**Lutostrak Islet.**—This small round islet, about a quarter of a mile in diameter and 86 feet high, lies about a mile off the N. end of Premuda island, and is the southern boundary of the principal passage leading from the open sea to the Quarnerolo channel. The islet is bordered by a narrow bank, which on the W. side extends off nearly a quarter of a mile.

The passage between Lutostrak islet and Gruizza light-house on the N. is  $2\frac{1}{2}$  miles wide; a mile NW.  $\frac{1}{2}$  N. from the islet is a patch with eight fathoms water, and 20 fathoms close to it. At a distance of  $2\frac{1}{2}$  miles NNE.  $\frac{1}{4}$  E. from Lutostrak islet is the Levante bank with five fathoms. To go S. of the bank, keep Morovnik islet shut in with the N. extreme of Selve island until Gruizza light-house bears NW. by W.  $\frac{3}{4}$  W. The Morovnik bank farther in is seven miles WSW. from Gruizza light-house, and when near it at night keep the light clear of this bearing.

Between Lutostrak islet and the NW. horn of Premuda island is a

smaller but somewhat higher islet than the former, named Kamenjak. There are from six to 23 fathoms water between the two islets, and four fathoms between Kamenjak and Premuda.

**PREMUDA ISLAND** is about  $4\frac{1}{2}$  miles in length, two-thirds of a mile in breadth, and its greatest elevation, which is near the middle, 319 feet; it is thickly covered with bushes, except in the neighborhood of the town, which is on the NW. side, on the slope of the highest hill, and contains about 1,500 inhabitants.

The NE. coast is precipitous, affords no shelter, and the water is all along deep. The N. end with the islet of Kamenjak on the W. forms a bay, the NE. horn of which is foul.

**Port Kreul**.—Four small islets and rocks ranging to 28 feet in height extend nearly  $1\frac{1}{4}$  miles parallel with the SW. coast of the northern part of Premuda, at a distance of about 400 yards, forming with it a channel called port Kreul, in which small vessels anchor in from two to four fathoms, mud, abreast of St. Ciriaco chapel, which is easily distinguished at a distance. With SE. winds the current sets rapidly through this channel and between the rocks. There is also anchorage for small vessels with off-shore winds in port Premuda, SE. of port Kreul.

Vessels of any size may anchor during a bora gale under the SW. side of Premuda island. Large vessels should come to in about 33 fathoms, sand, at nearly two miles from the shore, near the middle of the island; small vessels may anchor in the little port of Premuda, where the bottom is mud.

**SKADA ISLAND** is two miles in length, low, rocky, barren and covered with bushes; the highest part is a hill near the SE. extreme. The island is connected to Premuda by a ridge with  $5\frac{1}{2}$  to 10 fathoms water on it. The passage between is a mile wide, but is frequently difficult owing to the rapidity of the current over the ridge, the water being 30 fathoms deep on either side of it. Mid-channel should be preserved, as the opposite points of the two islands are shoal. A shoal with  $3\frac{1}{2}$  fathoms on it lies two-thirds of a mile SSW.  $\frac{1}{2}$  W. from the N. extreme of Skada, and a patch with  $4\frac{1}{2}$  fathoms a quarter of a mile off its S. point.

**ISTO ISLAND** is larger and higher than Skada, being  $2\frac{1}{2}$  miles in length and  $1\frac{1}{4}$  miles in breadth. The island is nearly divided by a deep bay running in SE., and another from the opposite side running in NW. It reaches a height of 598 feet on its NE. side, and has the appearance of two islands when seen from the southeastward. The village of Isto, at the head of the bay on the SE. side, contains the few inhabitants of the island.

The NE. shore is straight, and there are 30 fathoms of water, a third

of a mile from it; the SW. side is bordered by islets, rocks and shoals, with deep water between them, the latter extending off nearly  $1\frac{1}{2}$  miles.

There is no anchorage on any part of the coast, which is not exposed, excepting the two bays suitable to coasters.

The passage between Isto and Skada, which has a depth in the middle of 40 fathoms, is narrow, and its navigation is rendered difficult in its approach by the numerous rocks and shoals, and by the rapidity of the current.

In proceeding through this passage, the westernmost of the islets and rocks southwestward of Isto should be closed, and the whole of the group left on the starboard hand so as to avoid the  $4\frac{1}{2}$ -fathom patch lying a quarter of a mile off the S. point of Skada. On the N. side of the passage, a patch with  $1\frac{1}{2}$  fathoms, and deep water all round it, lies about three-quarters of a mile from the shore of Skada island bearing E.  $\frac{1}{4}$  N. from the northern extreme of the island; it can be avoided by keeping Skado or Isto aboard.

**MELADA ISLAND.**—This island is six miles in length in a NW. and SE. direction, and about  $2\frac{1}{2}$  miles in breadth, with a broken coast line; when seen from a distance it presents an irregular outline, formed by barren or bush-covered hills, the highest of which is to the northwestward, near Zappontello village, is cone-shaped, and 490 feet high, while its SW. point is 453 feet, and the hill at its E. end 300 feet high. The inhabitants number about 300, mostly mariners and fishermen.

The NW. part of the island is bordered on the W. by several islets, rocks and shoals, being a continuation of those fronting Isto island, of which Tramerka islet is the largest, and 185 feet high.

Melada is nearly connected to Isto, being separated only by a very narrow passage, three fathoms deep, which leads to the little port of Zappontello at the N. end of Melada.

**BERGUGLIE BAY.**—A tongue of land projecting in a lateral direction from the main body of Melada, forms on its SW. side an inlet  $2\frac{1}{2}$  miles deep, and a mile wide at the entrance, which gradually converges to its head, and takes the name of Berguglie bay. The bay has from nine to 22 fathoms water, is well sheltered from all winds, and a considerable number of vessels of any size may anchor in any part of it. The best berth is in nine fathoms, northward of an islet connected to the shore by shoal water, on the NE. side of the bay, where there is good protection from strong southeasters. Melada village is on the E. side at the entrance, where provisions may be obtained.

**LIGHT.**—A *fixed* white leading light is shown from the western window of a white house 30 yards from the beach, in the the southeastern part of port Lucina, Melada island, to guide vessels into Berguglie bay.

The light is dioptric, and is shown at an elevation of 30 feet above the level of the sea and 16 feet above the ground. It illuminates a sector of  $7^{\circ}$  between the bearings N.  $50^{\circ} 27'$  E. (which leads about 400 yards NW. by W. of Bacili shoal) and N.  $57^{\circ} 27'$  E. (which leads about 200 yards SE. by E. of Bonaster point).

To clear the point and the shoal keep in the illuminated sector.

**Bonaster Point**, the termination of the tongue of land forming the SW. side of Berguglie bay, is 453 feet high; at 600 yards from the shore and S. of it is a shoal with  $5\frac{1}{2}$  fathoms water on it; and to the eastward and rather nearer the shore, is the Bonaster, another rocky patch with only three fathoms on it.

**Golac Islet**.—This small islet lies on the S. side of the entrance to Berguglie bay, and in the passage between Melada and Grossa islands. Golac is 156 feet high, and between it and the N. end of Grossa is another islet, with a shoal patch with one fathom water, nearly in the middle of the narrow passage between them; the southern islet is connected with Grossa by shoal water, which closes the passage except for boats.

**Directions**.—The passage between Melada island and Golac islet on the S. is about half a mile wide, and is generally taken by vessels bound to Zara, the only difficulty being the rapid current. A vessel should bring Golac islet to bear about E. by N. and steer for it. Tramerka islet will be recognized by its double hill and bushy sides, and the position of the passage is indicated at night by Bianche light on Grossa island. The Bacili islets, 12 feet above the sea, and  $1\frac{1}{4}$  miles to the NW. by N. of Bianche light-house; and the  $5\frac{1}{2}$  and three-fathoms shoals off Bonaster point at the entrance to Berguglie bay, should have a wide berth.

Golac islet should be left a short distance on the S. or starboard hand; then steer about ESE. for the narrow passage between Ton Mali on the N., and Ton Veliki on the S.; the passage is only about 400 yards wide, but 18 fathoms deep. When past the two Tons, care should be taken to avoid the Bivosac and Kamenjak rocks, on account of the current. The N. extremes of Ton Veliki and Sferinac islets in line, or the latter just shut in, lead nearly midway between them. A shoal extends off nearly 200 yards from Bivosac.

If bound to Berguglie bay, a vessel should, after following these directions for entering, give Bonaster point a berth of at least 800 yards, in order to avoid the  $5\frac{1}{2}$  and the three-fathoms patches above mentioned; or if it is intended to go within the shoals, round the point at the distance of 300 yards, so as to pass midway between the Bonaster rock and the point.

**Port Manzo**.—The NE. coast of Melada is irregular, with two or

three small islets and shoals lying off and projecting from it, the outermost of the hidden dangers being rather less than a mile from the shore; and with the exception of port Manzo near the SE. end, there is no port or harbor.

Port Manzo is a bay about three-quarters of a mile deep, and  $1\frac{1}{2}$  miles from the SE. point of Melada; it is fronted by Asino islet, which is 58 feet high, and under which there is anchorage in eight or nine fathoms water, mud bottom. The Kamenjak rocks lie about 800 yards off the SE. point of Melada, and the Vertlac islet a mile off the SE. coast.

**SELVE ISLAND** is  $4\frac{1}{2}$  miles in length, nearly two miles in breadth at the northern part, where it is 292 feet high, while the southern part is 151 feet high, and being low in the middle has the appearance at a short distance seaward of two round islands sloping gradually toward the shore. It is tolerably well cultivated, and has a more fertile appearance than the neighboring islands; it contains about 650 inhabitants, whose chief occupation is fishing and the care of cattle. The coasts are generally of little elevation, and clear of danger. The island is connected to the S. end of Lussin by electric cable; and also from Nozdre cove on the E. coast with Puntadura island.

**Selve Road** is a bay formed on the W. side of the low land, about the middle of the island. It is a good anchorage in a bora gale for vessels of any size. The best berth is in 11 fathoms, sand and gravel, good holding ground, about a quarter of a mile from the shore, with Selve church bearing E. by S. Water and provisions may be obtained at the village.

**LIGHT.**—On San Antonio point, on the SW. side of Selve island, at an elevation of 28 feet above the sea, is a *fixed* white light, visible eight miles.

A *fixed red* light is shown from an iron lamp-post eight feet in height on the outer dike in the harbor of Selve. The light is 10 feet above the level of the sea and visible from a distance of two miles.

Position: Latitude  $44^{\circ} 22' 35''$  N.; Longitude  $14^{\circ} 42' 6''$  E.

This light is maintained for the use of fishermen, and its regular exhibition must not be depended upon.

**Pettini Islets** are three dark, barren, steep, narrow islets, the northern being about 140 feet high, and together extending over a space of  $1\frac{1}{2}$  miles in a NW. and SE. direction, and lying nearly midway in the channel between Selve and Premuda, and Skada to the southward. Detached shoals with six feet water on them extend three-quarters of a mile northwestward from their NW. extreme; and shoal water extends off the S. end.

Midway between the S. Pettini islet and the N. end of Isto island,

are the Crisice islets or rocks; and southward of these rocks, three-quarters of a mile from the N. end of Isto, and the same distance from the shore of Skada, is a rocky shoal with  $1\frac{1}{2}$  fathoms on it.

**ULBO ISLAND** is five miles in length N. and S., and its extreme breadth  $3\frac{1}{4}$  miles, but narrowing in the middle to three-quarters of a mile, the coast on either side forming a bay. Its N. end is 134 feet high, the greatest elevation of the southern part being 261 feet, and like Selve it sinks in the middle to low land. A considerable portion of the island is cultivated, and cattle are reared. The village is on the W. side.

Sib point, the NW. extreme of Ulbo, terminates in a long rock or islet nine feet above water, and from it shoal water extends off about 300 yards. On the NE. side of the island, the Fucin rocks reach off half a mile from the shore, they are mostly covered, and steep-to. A shoal extending three quarters of a mile from Ploc point, the S. extreme of Ulbo, terminates in a  $2\frac{1}{2}$ -fathom patch, which is marked by a beacon buoy. Elsewhere at a prudent distance from the shore the water is deep.

**Port Ulbo.**—Cinjega point, the W. extreme of Ulbo island, is bordered by shoal water and should not be rounded too close. The point is separated from the shore of Selve island, with the above exception, by a clear channel nearly three-quarters of a mile wide. Port Ulbo is formed by the bay N. of the point, and is exposed only between NNW.  $\frac{1}{2}$  W. and NW. by W. A berth will be found abreast the village in seven to 10 fathoms, sand and mud, at 600 yards from the shore. Small supplies may be obtained.

Between port Ulbo and Sib point on the N., the shore, at the distance of three-quarters of a mile, is bordered by a shoal, and on it is the little islet of Kuriak.

**Morovnik Islet and Bank.**—Morovnik islet, about a third of a mile in diameter, 41 feet high, and surrounded by shoal water, lies rather more than three-quarters of a mile from the extremity of Sib point and should not be approached too closely.

At  $1\frac{1}{2}$  miles NNW.  $\frac{3}{4}$  W. from Morovnik islet, is the rocky bank of the same name, about half a mile in extent, with from two to eight fathoms water on it. The shoalest part is in line with Morovnik and Kuriak islets, and from it the NW. extreme of Selve island bears SW.  $\frac{1}{2}$  S.

The islet and bank are on the E. side of entrance to the Ulbo channel, and the islet is two miles from the shore of Selve island, which bounds the western side of the channel. This passage is often taken by small vessels bound from Venice to Zara.

**Magresina Islet** is  $1\frac{1}{2}$  miles in length, about a quarter of a mile in breadth, 112 feet high, and lies  $1\frac{1}{2}$  miles eastward of Ulbo. A shoal

extends off about 300 yards from its N. end. The NE. part of the islet is bare, the remainder is covered with bushes. The smaller islet of Marghisitta, 38 feet high, lies half a mile to the SE. of Magresina, and the two are connected by shoal water which surrounds Marghisitta.

Poklib islet, 19 feet high, lies nearly midway between Magresina and Maon island to the NE. of it. This islet is nearly 400 yards in diameter, and the passage on either side of it is clear of danger.

**Pago Channel** is formed by Arbe and Dolin islands on the NE., and Laganj and Dolfin islets with the long, narrow projection of Pago island on the SW. The channel is everywhere clear and deep, it leads to the Morlacca channel, and is used by vessels bound to Arbe, or to Carlobago on the Croatian coast.

**PAGO ISLAND.**—This island is 32 miles in length, its extreme breadth five miles, the widest part being at the S. end, but the coast line is very irregular, indented with bays and deep inlets; the northern part for upwards of 10 miles is a mere tongue of land, on an average rather less than a mile across, and from 300 to 460 feet high. Mount St. Veto, the greatest elevation, is near the middle of the island and reaches 1,169 feet above the sea.

Pago island is one of the four large islands of the Quarnero group, but only a small portion, which is sheltered from northerly winds, is cultivated; unlike Arbe, to the N., it is unprotected by high land north-eastward, and its climate is comparatively very severe in winter, when it is frequently covered with snow, and northerly winds sweep over it with extreme violence. There are not more than 5,000 inhabitants, most of whom dwell in the town.

The chief products are salt, which is collected from numerous salt-ponds around a lake southeastward of the town of Pago, honey, oil, and wine. Sheep and goats are reared in considerable numbers. Only the N. part of the island produces wood of any kind.

Opposite to the mainland the coast is rocky, steep, and barren, with deep water at a short distance from it; it is constantly assailed by strong northerly winds, and excepting Pago bay, affords no shelter whatever.

A telegraph cable runs between Pago and Arbe islands; and between Pago at Prutna point and St. Vito on the mainland.

**Pago Bay.**—This so-called bay is a basin more than eight miles in length NW. and SE., and about two miles in breadth within the entrance narrowing to the northward. The entrance is on the NE. coast, a little southward of the middle, open to the SE., and by the land on the E. side overlapping by  $1\frac{1}{2}$  miles that on the W. forms a passage nearly half a mile wide, called Bocca di Pago. The basin is bordered by high land, more especially on the SW., the shores are generally clear of danger, but



on the SW. side about three miles from the W. point of entrance the shore is foul for some distance with rocks above water nearly mid-channel; the shore eastward of these rocks is also foul, but there are 12 fathoms water between.

The town of Pago is at the head of the bay,  $2\frac{1}{2}$  miles S. of the entrance. Both shores are here bordered by a narrow bank, and the anchorage is midway between, and three-quarters of a mile from the church, in about 12 fathoms, mud. Vessels which visit the bay for salt, anchor farther in and secure to the shore. There is also anchorage off a small bay just within the entrance to the NE.

**LIGHT.**—A *fixed* white light, with red sector from seaward, is shown from the head of the mole at Pago; visible two miles. The light is not shown on moonlight nights or during the bora.

**Directions.**—St. Cristoforo point, on the E. side of entrance to Pago bay has an old chapel on it, and at the foot of the point close to is a sunken rock. At nearly 800 yards from the point, S. by E.  $\frac{1}{2}$  E. from the chapel, is a rocky shoal with two fathoms water on it, and steep to all round. Three small rocks will be seen off the inner point on the starboard hand on entering, which are steep to.

In entering from the northward, there will be no difficulty in rounding St. Cristoforo point at the distance of 300 or 400 yards. In coming from the southward, when within a mile of the point, keep the western coast close aboard until the chapel bears eastward of N., then steer mid-channel.

**Coast.**—The long narrow projection of Pago island terminates sharp to the N. in Loni point, which has a chapel on it. At a third of a mile W. of the point the depth of water is seven fathoms, and at about half a mile southward of it, a shoal borders the shore with four feet on it. Thence southward, the W. coast is irregular, forming several coves, with deep water all along as far as Gaja point, a distance of 10 miles. Gaja point is foul for a third of a mile off, and the coast bank, with several patches of  $4\frac{1}{2}$  to 10 fathoms water, extends off  $1\frac{1}{2}$  miles, as far SE. as Slatina bay. The village and church of Novalja stand at the head of the little bay of the same name, on the S. side of Gaja point.

Slatina bay is four miles to the SE. of Gaja point, and is formed by a bend in the coast and by an islet and shoal ground extending northward half a mile from its W. point. The bay is open to NW., and there is anchorage for small vessels in eight or nine fathoms, mud.

**Port Simone**, a small inlet three miles SE. of Slatina bay, and NE. of Maon island, is protected on all sides, and has a depth of six to nine fathoms, muddy bottom; its entrance is only about 200 yards wide, and the N. point of entrance is foul.

**Skarda Island**, which lies  $1\frac{1}{2}$  miles southwestward of the W. point

of Slatina bay, Pago island, is a barren, bush-covered, rocky island,  $1\frac{1}{2}$  miles in length, with an elevation of 200 feet. The SE. extreme runs off shoal for more than a third of a mile.

**Maon Island** is rather more than three-quarters of a mile south-eastward of Skarda, and is also barren, partly covered with bushes, nearly five miles in length, and ranges from 100 to 235 feet in height; its N. and NW. end is bordered by a narrow bank. Vessels may take shelter from a bora under the SW. coast, in seven or eight fathoms, sandy bottom. Boats resort for refuge to the coves formed in this shore.

At a mile eastward of the S. end of Maon island is the little islet of Brusnjak, 124 feet high, and between the two a smaller islet or rock. Brusnjak is surrounded by shoal water, which extends eastward more than a third of a mile, narrowing the navigable part of this end of the Maon channel.

**Maon Channel**.—Skarda and Maon form with Pago island a channel 10 miles in length, with an average breadth of  $1\frac{1}{2}$  miles; but the SE. entrance is considerably contracted by the shoal extending eastward from Brusnjak islet and the shoals, extending westward from the shore of Pago island, the space between being a little more than three-quarters of a mile.

This channel, through which a rapid current flows, and which is frequently visited by violent bora gales, is seldom used, and is considered dangerous.

**Port Cossion**.—About seven miles SE. of port Simone is a shallow bay open to SW., but well protected by high land in all other directions. Good anchorage can be found in about the center of the bay, 13 fathoms, mud bottom. The southeastern part of the bay is called Bas Cove.

**New Pogliana**.—This bay is on the W. side, and near the S. end of Pago island, and at the NW. entrance of the New Pogliana channel; it is open to the NW., but otherwise sheltered from all winds. It is customary to drop an anchor seaward and to secure to the shore against the bora. A considerable swell at times sets in. The two points forming the entrance are shoal. The village of the same name stands on an eminence about 600 yards from the shore on the port hand, and marks the position of the bay.

**PUNTADURA ISLAND** is  $5\frac{3}{4}$  miles in length, its extreme breadth  $2\frac{1}{4}$  miles, and the highest part, which is at the NW. end, 404 feet above the sea; towards the E. it is low and narrow, and the island may be recognized by two flat-topped hills. Numerous flocks of sheep find pasture, but excepting a plain near the middle of the island, in which is a village containing about 250 inhabitants, it is uncultivated and overgrown with bushes. The greater part of the shore of Puntadura is bordered

by a narrow bank. The island is connected to the mainland by a telegraphic cable, through the Brevilacqua strait; and also to Nozdre cove, Selve island.

Nearly midway between Puntadura and Melada islands there is a narrow bank or ridge of sand, weed, shells, and coral, extending about  $7\frac{1}{2}$  miles in a northwesterly direction; the depth is nine fathoms at its SE., and 16 fathoms at its northwestern part.

**Anchorage.**—A depth of nine and 10 fathoms, muddy bottom and good holding ground, extends about three miles along the SW. coast or southward of the NW. point of the island. This locality is well protected by high lands from the bora. A large vessel should anchor in nine to 14 fathoms, at rather more than 400 yards from the shore, with the highest part of the island bearing about ENE.

Also, there is excellent anchorage in the large bay on the southern side of the island, sheltered from all winds. Large vessels should anchor in the middle of the bay, in from nine to 12 fathoms, mud, at half a mile from the shore. Small vessels anchor near Cosiak point, off Prisdaric cove.

Brevilacqua anchorage is southward of Puntadura island, off the entrance to the passage between the island and the mainland, in eight or nine fathoms, mud, at a long half mile from either shore.

Brevilacqua strait is a narrow boat passage with precipitous sides, between Puntadura island and the mainland, which almost joins; the depth at low water being only about one foot.

**LIGHT.**—Two *fixed* white lights, placed vertically 30 feet apart, are exhibited from the W. point of Puntadura island. The upper light is shown from a square, wooden tower on the W. side of the keeper's dwelling, which is also of wood. It is elevated 50 feet above the level of the sea, visible from a distance of 12 miles, and illuminates an arc of  $242^\circ$  between the bearings S.  $45^\circ 14'$  W. and N.  $16^\circ 46'$  W.

The lower light is shown from a window of the keeper's dwelling 20 feet above the level of the sea, is visible nine miles, and illuminates an arc of  $219^\circ$  between the bearings S.  $39^\circ$  W. and N.

Position: Latitude,  $44^\circ 19' 12''$  W.; longitude,  $15^\circ 1' 0''$  E.

**New Pogliana Channel.**—This channel, formed between Puntadura and the SW. part of Pago island, is the only practicable passage to Nona bay. The channel is narrow, and near the SE. end is contracted by shoals bordering the islands on either side to about 400 yards in width, and is four fathoms deep. The current always sets northward through this channel.

**Nona Bay.**—This bay, formed in the mainland at the NW. extremity of Dalmatia and at the SE. end of New Pogliana channel, is about two miles deep and  $1\frac{1}{2}$  miles wide, and its shores are bordered all round

by shoal water. The anchorage is about a mile from the head of the bay and nearly two-thirds of a mile from the eastern shore, in seven or eight fathoms; small vessels anchor farther in abreast of St. Giacomo church, at 600 yards from the shore, in about four fathoms. The bora is very violent here.

The town of Nona (ancient *Ænona*) is in the middle of an unhealthful swamp, and communicates by a causeway with the mainland. It was formerly a place of importance, but now contains but few inhabitants. Water may be obtained.

**The COAST** of Croatia is steep and rocky, backed by high mountainous land, and affords but little shelter.

**Jablanaz.**—The town of Jablanaz is at the head of a little bay, in which small vessels may take refuge; but the proximity of the anchorage in Barbato channel, Arbe island, is the cause of it being seldom used.

The SE. end of the island of Arbe, here contracts the Morlacca channel to less than a mile in breadth, and the Glavina point shoal, with  $2\frac{1}{2}$  fathoms, should be carefully avoided by vessels using this channel and when steering for the anchorage in Barbato channel.

Between Jablanaz and Carlobago, about  $13\frac{1}{2}$  miles to the SE., there are no places of shelter.

**LIGHTS.**—On the N. side of the little bay of Jablanaz, about 40 yards from the sea, an iron frame work is attached to the keeper's dwelling, from which is exhibited, at 151 feet above the sea, a *fixed* white light, visible 12 miles.

Also, on the left side of the entrance to the bay, about 20 yards from the shore, a *fixed red* light is shown, visible two miles.

**Carlobago.**—This is another small bay, and open to southerly winds. The anchorage is close inside the starboard point on entering, and, as the space is confined, it is customary to make fast to the shore. A sunken rock lies at the foot of the N. point. The passage between it and Pago island is rather more than a mile broad, but heavy weather at times renders it impracticable for several successive days.

The town and church of Carlobago is on the N. point, which, extending in a southerly direction, forms one side of the bay. It is a small town, containing about 1,200 inhabitants. Cistern water may be obtained at the town.

**LIGHT.**—At the head of the mole at Carlobago, a *fixed* white light is shown, visible eight miles. During the bora the light cannot be exhibited.

**The Coast** southward of Carlobago is still without any shelter whatever, except for small coasting boats. Morlacca channel continues south-eastward to Montagna channel, which terminates in Fiumera canal,

about 26 miles to the SE. of Carlobago. The current caused by the waters of Zermanja river is often rapid.

**Rosance Islets.**—In the middle of Montagna channel, and about three miles from Ljubaz strait separating the SE. extreme of Pago island and from the mainland, are the three low islets of Rosance.

Shoal water extends to the NW. of the eastern islets, to the westward of the western islet, and two detached patches lie on the S. of the latter islet, and westward of the former.

**Canale Fiumera.**—This very narrow passage about  $1\frac{3}{4}$  miles in length, leads to Mare di Novigrad, and carries throughout 10 to 18 fathoms water, which continues to within a few fathoms of the shores, which are about 50 to 100 feet high, with the land on the western side, in the middle of the canale, rising 350 feet above the sea. It presents a picturesque appearance. On either side the entrance there is shoal water, and consequently it is not of easy access for large vessels. In summer, the wind generally blows up the strait by day and down by night.

**Mare di Novigrad** is a fine basin about  $5\frac{1}{2}$  miles in length E. and W., and from one to  $2\frac{1}{2}$  miles in breadth, with from eight to 15 fathoms water, mud, and surrounded by high and well-wooded hills. The town of Novigrad is on the S. side of the lake, defended by a fort, but of little importance.

The Zermanja is one of the chief rivers of Dalmatia; it rises in the mountains of Croatia, receives the waters of Kruppa river, and flows into Mare di Novigrad.

Mare di Karin is a nearly circular basin about  $1\frac{1}{2}$  miles in diameter, bordered by high hills S. of, and communicates with, Mare di Novigrad by a narrow passage similar to Canale Fiumera, but not so deep. It is visited by oyster boats only.

**Ljubaz Strait** is a narrow winding passage between the SE. extreme of Pago island and a projection from the coast of Dalmatia. The land on each side is elevated and precipitous. The depth through the strait is from 13 to 31 fathoms; the current from the Mare di Novigrad, accelerated by the waters of the Zermanja, sets strongly southwestward through it, and the bora blows with violence. This strait leads to several bays between the S. end of Pago island and the Dalmatian shore, including Ljubaz, and Nona in Dalmatia; and Dinjiska, and Old Pogliana in Pago island, and out through New Pogliana channel. These bays are visited by coasting vessels only, which generally proceed here by New Pogliana.

For the navigation of these bays and channels, the chart and the eye must be the guide.

## CHAPTER IX.

### COAST OF DALMATIA FROM ABREAST THE SOUTHEAST END OF PAGO ISLAND TO PORT ROGOSNIZZA.

VARIATION in 1883.

Grossa island, NW. end  $9^{\circ} 59'$  W.

Port Rogosnizza,  $9^{\circ} 39'$  W.

**The COAST** of Dalmatia commences in about lat.  $44^{\circ} 22'$  N., the confines of Croatia and Dalmatia on the sea-shore being marked by the church of Maddalena, which stands at the head of the cove of the same name. It extends southward as far as the vicinity of Lastua castle, in lat.  $42^{\circ} 12'$  N., and has numerous indentations, affording good anchorage, with many off-lying islands and rocks, and deep water near the shore. The bora often blows with great violence.

Dalmatia is a mountainous country; it is traversed by the Dinaric Alps, of which the most remarkable chain is that of Montenegro, which stretches from the Alps to the Archipelago, and consists of steep and barren elevations, the ordinary height of which is about 3,000 feet. The heights bordering the shore at a short distance are generally bare and precipitous, with well cultivated bases seaward. In the interior are extensive forests of oak, fit for shipbuilding; those formerly near the shore have been exhausted.

The inhabitants are more addicted to lawless than to commercial or other legitimate pursuits, and never travel unarmed. Although this country embraces an extent of nearly 400 square miles, there is not a single collection of dwellings worthy of being called a village. Formerly, wine, oil, corn, figs, almonds, salt, wood, and salt fish were exported. Water is generally scarce.

The department of Zara and Sebenico includes the coast between Brevilacqua strait and Planka point to the southward, an extent of about 60 miles, and various islands and rocks.

**GROSSA ISLAND** is about 25 miles in length, in a NW. and SE. direction, and its breadth varies from one to  $2\frac{1}{2}$  miles, the coast line on the NE. side being irregular, with a deep indentation in the direction of the island, both at its NW. and SE. ends.

Its NW. extreme consists of low rocky land of whitish appearance; the height increases thence towards the S. in a line of ash-colored rocky elevations; the highest part, mount Vela Straza, 1,135 feet, is a

little SE. of the middle of the island. There are about 2,000 inhabitants; the chief trade is in salt fish, firewood, and salt procured from lake Comna at port Tajer. The only villages are on the NE. extreme of the island.

**LIGHT.**—On Bianche point, the NW. extreme of Grossa island, is a conspicuous white light-tower, which exhibits, at 135 feet above the sea, a *fixed* white light varied by a *flash* every *two minutes*, and visible in clear weather for a distance of seven miles.

**Bacili Islets.**—These two islets are perfectly flat, and 12 feet high, surrounded by shoal water, and should be given a berth of half a mile; they lie about  $1\frac{1}{2}$  miles to the NW. by N. of Bianche point light-tower. The shoal water extends nearly 800 yards to the NE. of the islets, and the depth of water between it and the shoal ground around the NW. end of Grossa island is  $3\frac{1}{2}$  to four fathoms.

**Port Lungo**, which is eastward of Bianche point and the Bacili islets, affords shelter to small craft, in 10 fathoms, sand, about half a mile from Soline village, at the head of the port.

In proceeding to this anchorage, whether passing northward or southward of Bacili islets, a good berth should be given to the shore under the light-house and also the W. point of entrance, which are bordered by shoal water, at a distance of more than 400 yards. Having opened the village, steer for it, but avoid the western shore.

**Pantera Cove**, in the northwestern part of Port Lungo, affords good anchorage for fishing boats and other small craft; the entrance is narrow, but deep, and the cove is a mile long and about half a mile wide.

**The Southwest Coast** of the island is rocky and inaccessible. Taler islet, 41 feet high, two-thirds of a mile from the shore, and Misnjak rock, with four fathoms on it, about a mile southward from this islet are the only outlying dangers.

**Anchorage.**—Vessels may anchor for protection from a bora gale along the SW. coast, at a distance of from a half to three miles, in about 36 fathoms, sand. The places ordinarily preferred are from abreast of mount Vela Straza to about three miles from Taler islet, and between the latter and Bianche point. The anchor should be weighed as soon as the gale will permit. The soundings farther southward are deep close in to the island.

**PORT TAJER**, which is at the SE. extreme of Grossa island, and surrounded by barren hills of moderate height, is one of the best ports in this quarter of the Adriatic. It consists of several basins communicating with each other, and has sufficient space for a considerable number of vessels in depths varying from seven to 27 fathoms, generally sandy or mud bottom.

The anchorage in the first of these basins is to the NNW. of two small islets, in 29 fathoms, sand, or a vessel may anchor with the outer islet bearing WNW: distant about half a mile, in 33 fathoms, mud.

Small craft frequently anchor on the NW. side of Katena island, near which is a little islet or rock, and WSW. of the latter is a shoal with a square beacon of masonry  $15\frac{1}{2}$  feet high, rising from a depth of 12 feet.

The second basin, the passage to which is along by the SW. shore, between it and a  $2\frac{1}{2}$  fathom shoal, is about 400 yards to the NE. of the shoal. The depth in the center of the basin is 15 to 16 fathoms.

The third basin is beyond the second; vessels anchor in 11 fathoms southeastward of an islet which will be seen on entering.

The fourth, which is the best of the basins, and farthest in, has a depth of seven or eight fathoms, and is perfectly sheltered. Vessels may here safely heave down for repairs; northwestward of two bare islets in the W. part of this basin the depth is from  $2\frac{3}{4}$  to five fathoms.

Neither water nor provisions can be obtained at port Tajer.

**LIGHT.**—On the NW. extreme of the larger Sestrice islet, at the entrance to port Tajer, is a tower 85 feet high, painted in red and white spiral bands. The tower exhibits, at 156 feet above the sea, a *fixed white light, with alternate white and red flashes* EVERY MINUTE, and visible from a distance of 17 miles.

**Directions.**—Port Tajer is not of difficult access, although numerous islands are in the way, but there are no hidden dangers. Four islets lie off the entrance, the Sestrice islets to the SE., and the two Germiniach islets to the NW.; the larger of the Sestrice and the larger of the Germiniach are the nearest to Belvedere, the NW. point of entrance, except the Tajer rock (three feet above the sea), which is about 400 yards westward of the point, and has a flat trencher-like appearance, whence its name. The Sestrice with the Abatuta islets should be left on the starboard hand in entering, and a course steered northward to pass between them and the land within Belvedere point until the narrow entrance to the port is opened.

A five-fathom patch lies in line of the W. extreme of the larger Sestrice and Abatuta, a third of a mile within the former islet.

There is no passage between Grossa and Incoronata islands, except for boats or vessels of very light draught, and the difficulty is increased by the current, which often sets strongly to the SW.

**Coast.**—The NE. coast of Grossa island has many bays, with numerous off-lying rocks and islets, in navigating among them the chart must be the guide. The only anchorage suitable for vessels of moderate size is that inside of Kerknata islet, in about 10 fathoms, sand. Zaglava vil-



lage, on an eminence opposite Kerknata, is a good mark, and it is about  $5\frac{1}{2}$  miles from the SE. end of Grossa.

**Sale.**—The village and cove of this name is about  $3\frac{1}{2}$  miles from the SE. end of Grossa, and opposite the N. end of Laudara island; it is visited by coasters, and a *red* light visible two miles is shown from the mole head.

**Laudara island**, about two miles long in a NW. and SE. direction, half a mile wide, and 313 feet high, lies E. by S. from Sale. The channel between it and Grossa island is  $\frac{3}{4}$  to a mile wide and free from all dangers. Little Laudara lies about 400 yards SE. of Laudara; it is very small. About a mile NW. of Landara are the islets of Mertinick and Tukosiak. Halfway between Laudara and Mertinick is a rock awash. A shoal extends 400 yards S. from Tukosiak and  $\frac{1}{2}$  a mile E. of the islet is a  $4\frac{1}{2}$  fathom patch.

**Luka.**—Luka island, under mount Vela Straza, forms, with a projecting point to which it is nearly connected and parallel with the shore, an inlet about a mile deep, and a quarter of a mile wide, with from eight to 20 fathoms water. The village and church of Luka are at the head of the inlet. No supplies can be obtained here.

Rava island, N. of Luka, is well cultivated, with a village and church on its central and highest part, and may be safely passed on either side.

Coasters anchor southwestward of Rava, and under various other islets on the NE. coast of Grossa.

**INCORONATA ISLAND.**—This island is more than 13 miles in length, and  $1\frac{1}{4}$  miles in extreme breadth, becoming very narrow to the southward, where it diminishes in one place to about 200 yards across. It may be said to form a continuation of Grossa island, and at a distance appears to be a range of whitish conical hillocks resembling the points of a diadem, hence its name. The highest of these elevations, mount Veli Vrch, at about one-third from the N. end of the island, is 798 feet above the sea, and mount Opat, the S. extreme, 373 feet.

A continuous chain of islets, rocks, and shoals, with deep water between them, borders the whole SW. coast of Incoronata island, the islets ranging to about 400 feet in height. To the northward of the narrow portion of the island there are numerous anchorages for coasting vessels, but the navigation of these localities is very difficult for strangers, especially as the current sets rapidly through the passages. Most of the dangers here are, however, a little elevated above water. Between the two Rassip islets, which is one of the widest openings, there is a shoal with two feet of water.

A short distance outside the islets there is a considerable depth.

The group of islets and rocks southward, abreast of the S. end of In-

coronata, are not safe to approach, and there is no anchorage whatever near them.

**Curbabella Islet.**—This narrow islet,  $2\frac{1}{2}$  miles in length, and 343 feet high, is the southeastern of the group lying off the S. end of Incoronata; its rounded hillocks are rather lower than the neighboring islets of Scuglie and Smokvica to the N. of it.

**LIGHT.**—On Lucietta islet, the southwestern of the group off the W. end of Zuri island, from which it is distant  $2\frac{3}{4}$  miles, is a light-tower, which exhibits, at an elevation of 125 feet above the sea, a *fixed* white light varied by a *flash* every *thirty seconds*, and visible at a distance of 17 miles.

**Directions.**—The whole space between the SE. end of Incoronata and Zuri island is scattered with islets, rocks, and shoals, with deep water between them, and it is impossible to give any special directions for its navigation, more especially as the currents are often strong; the chart and the eye must therefore be the guide. A vessel will however avoid all risk from known dangers by bringing Lucietta light-tower to bear N., and then steer for it, passing on either side; then bring it to bear S., and keep it on that bearing. This line will lead two-thirds of a mile eastward of Sedio islet and the Botticella rock, and nearly the same distance westward of the Nodre rock, and clear of the other islets into the Zuri channel.

**Coast.**—The whole NE. coast of Incoronata consists of inaccessible cliffs; the opposite coast of Zut is also steep. The depth in the middle of the passage is 38 fathoms, sand and shells, and there is scarcely anchoring ground along the shore of Zut for the smallest vessel. If a vessel from eastward should be obliged to take this passage she should at once close one of the two islands, and pass on the port, or on the starboard hand, all the islets, rocks, and shoals, near the middle of the entrance.

**MEZZO CHANNEL.**—This channel, which is a continuation of that of Quarnerolo, with which it communicates by various narrow passages between the islands, contains many islets, rocks and shoals, and is little frequented, preference being given in fine weather to the passage outside the islands, and, under other circumstances, to Zara channel.

For vessels approaching by Sette Bocche channel, or that between the SW. end of Melada island and Golac islet at the N. end of Grossa island, there are three passages to Mezzo channel:—The first is between Grossa and Sferinac islands; in taking this passage, Sferinac should be kept close aboard at the N. entrance to avoid the shoals off the coast of Grossa island. The second passage is between Sferinac and Ton Veliki island; at the S. end of this passage a shoal, with  $2\frac{1}{2}$  fathoms water,

lies in mid-channel, and either side of the passage should be kept aboard to avoid it. The third passage is between Ton Veliki and Sestrugn, which is wide and clear.

There are also passages from the Quarnerolo channel to Mezzo channel, between Sestrugn island on the one side, and Rivagn and the Tre Sorelle islets on the other; and a narrow passage, only  $3\frac{1}{2}$  fathoms deep, between Rivagn island and the NW. end of Uglian, with a strong current through it.

The Tre Sorelle islets (three sisters), the northern of which is 112 feet high, extend two miles in a northwesterly direction from Rivagn island, and about a third of a mile beyond them in the same direction is a sunken rock with about two feet water on it. About a mile farther on and nearly half a mile from the shore near the N. end of Sestrugn is a shoal with  $2\frac{1}{2}$  fathoms.

Between Eso and Uglian islands there are no hidden dangers but the sunken rock hereafter named; but farther southward, between In-coronata and Pasman islands, the middle of Mezzo channel is rendered impracticable, excepting to boats, by islands, islets, rocks and shoals. Zut and Zit islands are the most important of these; they are of sterile aspect, but afford pasturage to numerous flocks of sheep.

In continuing to the southward from Eso island, the passage through the Mezzo channel is along by Pasman island, between it and Zit island, and the eye and chart should be the guide.

**Anchorage.**—Shelter may be obtained from a bora gale at about 300 yards southwestward from the centre of either of the two northern of the Tre Sorelle islets, in nine or ten fathoms, sand; but exposed to southeasterly and northwesterly winds, and the current is strongly felt. There is also anchorage between the N. end of Rivagn and the coast of Sestrugn.

**Sestrugn Island** is nearly six miles in length, with an average breadth of about three-quarters of a mile; it ranges from 500 to 635 feet high, is the most elevated of the islands in the neighborhood, and is covered with bushes, excepting the cultivated space around the village, which is one-third from the S. end of the island.

Shoal water extends a quarter of a mile off the NW. extreme; the island of Rivagn, and the Tre Sorelle islets and dangers just mentioned lie off its NE. side; and two small islets off its SE. end.

**Rivagn Island** between Sestrugn and the N. end of Uglian is  $2\frac{1}{2}$  miles in length, and 350 feet high, with a church on its summit.

**Saida Shoal.**—This danger lies NNE.  $\frac{1}{4}$  E., about a mile from the N. extreme of Rivagn island. It has  $2\frac{1}{2}$  fathoms on it, deep water around, and is marked by a white beacon buoy with iron cage sur-

mounted by a ball, with Idolo islet SE.  $\frac{3}{4}$  S., and the summit of the middle Tre Sorelle islet SW. by W.  $\frac{1}{4}$  W.

**Eso Island**, which lies in the middle of the northern part of the Mezzo channel, is  $6\frac{1}{2}$  miles in length, about a mile in breadth, and its greatest elevation, which is nearly one-third from the N. end, 582 feet. Nearly the whole of the NE. portion is cultivated; the opposite side is covered with bushes. There are about 350 inhabitants, who manufacture earthenware for exportation.

Its NE. side is irregular, forming several coves, in one of which is the village of Eso-ponentale; four islets lie off it, and a quarter of a mile NW. of Knezak, which is nearly joined to Eso, and about the same distance from the shore, is a sunken rock.

Vessels entering the Mezzo channel, after passing the S. end of Ses-trugn, should keep on the Uglian island side, so as to avoid the dangers off the NW. end of Eso.

**Belli Islet**.—This little islet, 145 feet high, lies off the NW. end of Eso, and southward of it are three smaller islets and a sunken rock about 300 yards from the shore of Eso. About 1,100 yards to the N. by E. of Belli islet is a shoal with three feet water on it, and three-quarters of a mile NW. is another with six feet on it. Vessels at times take shelter between Belli and Eso, in about 11 fathoms, sandy bottom; but midway there is a shoal with  $3\frac{1}{2}$  fathoms.

**Kudica and Fulia** are two islets lying about a quarter of a mile off the western shore near the center of Eso island; there is a five-fathom patch just NW. of Kudica, and one of four fathoms NW.  $\frac{1}{2}$  N. of Fulia.

**Dragojestjak Islet**.—This islet 98 feet high, lies about one mile N. by E.  $\frac{1}{2}$  E. from Parda point; there is bold water all around it.

**UGLIAN ISLAND**.—This island is  $11\frac{3}{4}$  miles in length, with an extreme breadth of two miles. Its hills are of moderate elevation, the most remarkable and highest being mount Grande, 971 feet above the sea, in the middle of the island, and another hill a mile to the SE. has on it the old castle of St. Michiele. There are about 3,000 inhabitants, who principally reside on the NE. side. Wine and oil are the products, and fishing is the chief occupation. Like most of the Illyrian islands, Uglian affords but little fresh water.

**The Southwest Coast** rises abruptly, is steep-to, covered with wood, and uninhabited. At its S. end, the coast falls back and forms two or three bays, fronted by three islets, and some shoal patches with  $2\frac{1}{2}$  and  $3\frac{1}{2}$  fathoms water on them. Lamaine, one of these bays, is resorted to by small craft. This side of the island, with that of Pasman, forms the NE. side of the Mezzo channel.

**The Northeast Coast**, which slopes gradually to the sea, is irregular, forming several coves, of bold approach, and bounds the SW. side of Zara channel, the distance between its nearest part and the town of Zara being about two miles. The only anchorage is port Kale, southwestward of Kalughera or Lazaretto islet, between it and the island; the islet is 343 feet high, overgrown with bushes, and on the NW. side of it are a house, some mills, and a patch of cultivated ground.

The town of Kale is small. Cistern water may be obtained in small quantities.

**Port Sdrelaz** is a little basin formed by the narrow space between Uglian and Pasman islands, and has a depth of little more than two fathoms, mud bottom. The NE. passage is alone practicable for vessels; at the SW., the two islands are nearly united, and the space between is called Sdrelaz strait.

The small island of Misiak lies off the entrance to port Sdrelaz, distant from the shore about a third of a mile.

**PASMAN ISLAND.**—This island is  $11\frac{1}{2}$  miles in length, or nearly the same as Uglian, and its breadth near the middle  $2\frac{1}{2}$  miles. It reaches a height of 921 feet, about one fourth from its NW. end, and is rather more hilly than Uglian, of which it may be considered a continuation, with the interruption of the narrow Sdrelaz strait. It contains about 3,500 inhabitants, the greater part of whom reside in villages on the NE. side; their occupations and the produce of the soil are similar to those of Uglian.

**Port Longin and Soline Cove**—the former northward of Kosara islet near the S. extreme of Pasman island, and the latter a short distance to the NW.—are frequented by small craft, which make fast a cable to the shore; in both, the depth is about 12 fathoms. Bora squalls are severely felt in them.

**Triluke Cove** at the SE. extreme, is convenient for small vessels prevented by the current or contrary winds from proceeding through Pasman strait; it has a depth of 10 to 15 fathoms, muddy bottom, and is well protected from the bora and westerly winds, by the land and Sisanj island, and from the southern quarter by Gangerol and the Kotola islets. A rocky shoal, with about three feet water on it, lies near the E. point of Sisanj island, and farther out, at the distance of nearly half a mile and two-thirds of a mile respectively from the SE. side of the island, are two rocks above water, with five fathoms between them and the shoal. The passage to the anchorage is to the northward of the Kotola islets and shoal just named.

**Galiola Rock**, two feet above water, lies  $1\frac{1}{2}$  miles WSW. from the center of Kosara island; it is the outermost of the many dangerous

reefs and islets which are off the eastern coast of Zut island. A vessel passing through this portion of Mezzo channel should keep the Pasman island side well aboard.

**ZARA CHANNEL.**—The depth in this channel, between Uglian and Pasman islands and the coast of Dalmatia, varies from 27 fathoms, at the entrance, to eight fathoms, mud and sand, near Tasman strait. There are no hidden dangers, if we except the Saida shoal, and a four-fathom rocky shoal lying about W.  $\frac{1}{4}$  S.  $2\frac{3}{4}$  miles from the village of Zaton on the mainland.

The main coast, from Artic point, about a mile SW. of Brevilacqua strait to 4 miles southeastward of Zara, is backed by low hillocks and well-cultivated ground; thence southward, as far as the neighborhood of the town of Zara Vecchia, the land is higher and of desolate aspect.

**Anchorage.**—Diklo anchorage, about eight miles from Artic point, is in a depth of 10 or 11 fathoms, mud, a little southward of the town of Diklo. About  $3\frac{3}{4}$  miles northward of Diklo is the town of Petercane close to the sea, and commanded by a hill 220 feet high in the rear of it.

**PORT ZARA**, a secure little harbor, rather more than 200 yards wide, is two miles southeastward of Diklo, and inside a point, which extends to the NW. nearly three-quarters of a mile parallel with the coast, and upon which the town of Zara is built. A mole upwards of 200 yards in length projects from the shore opposite the N. point of the town, which in part covers the mouth of the port, leaving only a narrow passage. The soundings are eight and 10 fathoms near the entrance, whence they decrease regularly to two fathoms at the head of the port; the bottom on the NE. side is rocky. Vessels moor across with a cable to each shore.

**Buoys and Beacons.**—A white buoy, belonging to the Austrian Lloyd's company, lies in eight fathoms water, in the widest part of the harbor, opposite Bora cove; small vessels of war are permitted for temporary purpose to make fast to the buoy, but if the vessel is of any length it will be necessary to haul the stern in towards the S. point of Bora cove, as there is not room to swing. There is room in the port for one or two small vessels to moor head and stern, but the buoy is in the best berth. A mooring buoy also lies outside the port W. of the town. A buoy with a globe lies in 16 feet water, 80 yards W. of Cereria point, in the port of Zara; it is painted white with a black horizontal band on the upper part. Vessels entering Zara should not pass between the buoy and point.

Also, on the shoal extending from Maestro point, is a white stone beacon, eight feet high, and erected in 11 feet water; it is 76 yards from the shore, and no passage inside it.

**The Town of Zara** (ancient *Jadera*) is the residence of the governor of Dalmatia, surrounded by fortifications and cut off from the mainland by a ditch. It contains about 10,000 inhabitants who carry on considerable commerce in wine, oil and grain. An arsenal, storehouses, hospitals, barracks, the ruins of an aqueduct, an opera house and a fine cathedral attest its former importance; the marine gate is part of an ancient funeral arch. The neighboring town of Nona has furnished it with many relics of antiquity.

**Supplies.**—Water may be obtained from a spring half a mile southward of the town, near an old lazaretto close to the shore; rain water only can be obtained in the town. Provisions are plentiful. *Maraschino*, made from the *marasara*, or wild cherry, is the chief export.

**LIGHTS.**—At Amica point, a mile northward of the town of Zara, a *fixed* white light is exhibited at an elevation of 39 feet above the sea, visible in clear weather from a distance of 11 miles.

During thick and foggy weather the fog bell at Amica point light-station is rung *during one minute*, with an interval of two minutes of silence, whenever the signal of passing vessels is heard.

At the extremity of the mole at port Zara, and on the opposite point of entrance, *fixed red* lights are shown, visible three miles.

**Anchorage.**—Vessels too large to enter the port anchor about a quarter of a mile northward of the town, in 12 or 13 fathoms, mud bottom, or farther out if necessary.

There are none but indifferent anchorages on the Dalmatian coast between Zara and Pasman strait. Small vessels, however, bring to between Zara and Bibinje, in nine or 10 fathoms, muddy bottom, at about 400 yards from shore; also in  $5\frac{1}{2}$  fathoms, at port St. Cassano, on entering which, it is necessary to drop the anchor near the middle, whence the soundings decrease rapidly, becoming rocky near the shore. Vessels also anchor northward of Salisnjak island, at the entrance to Pasman strait, in  $5\frac{1}{2}$  fathoms, a short half mile from the shore.

**PASMAN STRAIT**, a continuation of Zara channel, is rendered difficult by the numerous islets, rocks, shoals and currents in the vicinity of the town of Pasman, and the narrowest part of the channel. Both sides are well cultivated and produce oil and Muscatel wine.

Babac islet, 106 feet high, is the largest and principal of the group of islets lying in the middle of the strait. The western passage, or that between Babac and the town of Pasman, is the deepest, carrying  $4\frac{1}{2}$  fathoms the least water, and, though narrow, is the most frequented.

**LIGHT.**—On the W. extreme of Babac islet is an iron stand, from which is exhibited, at 22 feet above the sea, a *fixed* white light, seen at a distance of 10 miles. The light is visible when bearing from about

SSW. through S. and E. to NW.  $\frac{3}{4}$  W., and consequently not seen in the southeastern part of the eastern passage.

**Directions.**—Vessels from the northward, in closing with Babac islet for the western passage, should keep about 400 yards from the N. part of the town of Pasman, so as to avoid the coast bank on the Pasman side; the E. side of Zavala islet (50 feet high), touching or just open of the W. point of Babac islet, will clear the shoals on the E. side NW. of Babac; edge cautiously to the southward, midway between the town and W. extreme of Babac, on which is a chapel and light establishment; then close with Montan islet, passing it at rather less than 200 yards, until past the  $2\frac{1}{4}$ -fathom shoal lying nearly in mid-channel; then proceed to the SE. northward of Zavala islet, and SW. of Planac and St. Caterina islets.

As there are no leading marks for the western passage, and the course has to be altered in the narrowest part, and from the strength of the current the shoals may alter, great caution is required.

The eastern passage, or that between Babac islet and the coast of Dalmatia, is the straightest and appears the easier of the two for vessels under 18 feet draught. Round the N. side of Komornik islet at the distance of 300 yards, and keep along by Babac at that distance, leaving the Kocinsko shoal, which is marked by a white stone beacon 13 feet above the sea, to the NE.; pass Zara Vecchia about 300 yards off, and the islets W. of it on the starboard hand, into the middle of the channel.

The bottom is, almost everywhere, sand and shell, and the water being very clear the depth often appears less than it is. Both the ebb and flood tides in the channel are very perceptible, and attain at times a rate of two miles or more an hour. When the current is opposed by a strong wind an increase of depth takes place, especially at the narrowest parts.

About two miles southeastward of Zara Vecchia, 300 yards from the shore on the right of the entrance to the strait, is a rock, off which is shoal water.

When proceeding to Pasman strait from the southward, the passage between the NW. end of Morter island and Great Arta on the NE., and Vergada and off-lying islets and shoals to the SW., may be used. In taking this passage the Moll rock, four feet high, and the smaller islets and dangers should be avoided, and the chart should be the guide; or the passage between Vergada and off-lying islets, and Kosina on the E. and Obonj and the Kotola islets on the W., may be taken, passing either side of the little islet of Kamicic.

**Anchorage.**—Vessels anchor northwestward of Zara Vecchia; or in the middle of the strait, southward of St. Caterina islet. Cistern water



in small quantities, the only supply, can be obtained at Zara Vecchia, an unimportant but the chief town or village in the strait.

**Vergada Island**, which is  $2\frac{1}{2}$  miles southeastward of Pasman island, is  $1\frac{1}{2}$  miles in length, and formed by arid hillocks of nearly equal height; its most elevated part is 400 feet above the sea, and there is a village on the NE. side. There is no good anchorage, and several islets and shoal patches lie around it.

The islets **Obonj**, 104 feet high, and **Sebnata**, 89 feet high, lie to the westward of Vergada island; the former distant  $1\frac{1}{2}$  miles, and the latter about half a mile. There is a good channel between them. Four hundred yards N. of Obonj is a three-fathom patch.

**Oblig**, **Gida**, **Vortlic**, **Morvenjak**, and **Vissovak** are small islands lying SE. of Vergada. The largest of the group is Morvenjak, which is 178 feet high.

**The Coast** of the mainland, between Zara Vecchia and Tunara cove, should not be approached too near; a depth of  $5\frac{1}{2}$  fathoms will be found at little more than 300 yards from it, and at this distance coasters may anchor if detained by bad weather.

**Tunara Cove**, on the N. side of the point of this name, is open to the westward, but is somewhat sheltered from this quarter by the off-lying islets; the depth in the middle is  $5\frac{1}{2}$  fathoms, sand. A hill overlooks and marks this anchorage, a small vessel in proceeding to it should pass between Gavinac islets and the S. point of the bay; the passage northward of the islet is not so good.

**Lake Vrana**, which lies at the back of this part of the coast and parallel to it over a distance of  $7\frac{1}{2}$  miles, renders the air in the vicinity unwholesome.

A shallow bay SE. of Tunara cove is formed by the mainland and Great Arta island, with the islets just off the N. end of Great Arta; it is about a mile deep and the same width, and offers anchorage for vessels during fine weather, but is not recommended with northerly winds, which draw through Pasam strait, creating a rough sea in the bay.

**Great Arta Island** is about a mile long and half a mile wide, its highest point being 347 feet. The island is connected with the mainland by a sand shoal having two fathoms of water over it.

**Zlosela Bay** is a deep inlet in the main coast running to the SE.; it is fronted by the N. part of Morter island, which, with several smaller islands, islets and shoal water, completely covers and blocks the approach to the bay to all but very small vessels.

Water and provisions may be obtained at the town of Zlosela; fish are plentiful in the bay.

**MORTER ISLAND** is six miles in length, with an irregular coast line, its greatest breadth not exceeding  $1\frac{1}{2}$  miles; it rises near the center to 408 feet, and is connected with the mainland by a swinging-bridge. It is exceedingly well cultivated, and has about 2,500 inhabitants, who reside on the northern and eastern sides, and whose chief occupation is the culture of the vine, the fig, and the olive. It appears to have been an ancient cemetery. The view from the island is very beautiful.

The SW. coast, which is uninhabited, has deep water close to it, and affords no places of shelter even for very small vessels, except Kosirina cove, and the little inlet of St. Nicolo; in this latter they bring to when not intending to enter the channel at night. The high point at the left of the entrance, which is sugar-loaf shaped, marks this anchorage.

The **Kuljar Islets** are three small islets, of which the western is the largest, about three-quarters of a mile southward of St. Nicolo inlet; they are of bold approach except the W. side of the westernmost, off which is a rocky shoal awash.

**Berghofer shoal**, with  $2\frac{1}{2}$  fathoms water on it, lies half a mile from the shore of Morter island, and SSW.  $\frac{3}{4}$  W. from its extreme point, with the S. end of Drasemaki islet in line with Treboconci church bearing about E. The church stands about a third of a mile northward of Lukoran island. The shoal is marked by a beacon bell-buoy of white open work surmounted by a cage.

A small half-tide rock, named Botticella, shaped like a boat, lies S. by E.  $\frac{1}{4}$  E. about one mile from a tongue like point on the main coast, and W. a mile nearly from Prisnjak islet, and on it is a stone beacon. The vicinity of both these dangers should be avoided, especially at night.

**Anchorage.**—Vessels anchor in Morter bay between Morter island and the mainland, in  $11\frac{1}{2}$  fathoms, near Stretto town, and in the small bay abreast of the town. The channel NW. of the bridge is used by vessels of very light draught.

**LIGHT.**—A small *red* light is shown from a lamp-post on the buttress of the swinging-bridge at Stretto, 20 feet above the sea, and visible two miles.

In approaching the SE. part of Morter channel, where there are several islets, the clock-tower of Jeserà is visible at a considerable distance. Nearly equidistant between the three islets, at the head of the bay, is a shoal with  $2\frac{1}{2}$  fathoms water on it.

**ZURI ISLAND.**—This is the southernmost of the group of large islands northwestward of Planka point; it is nearly  $6\frac{1}{2}$  miles in length, its extreme breadth about  $1\frac{1}{2}$  miles, tapering at either end, with irregular and indented shores, and formed by two parallel lines of hills, the most elevated of which is 452 feet. At a distance the island appears

divided into two parts; the plain between is well cultivated. Zuri village is at the foot, northeastward of the NW. hill.

On approaching from southward, the coast southeastward appears covered with trees and bushes; northwestward it is generally rocky and of whitish aspect.

There are coral fisheries in the neighborhood; sardines and other fish are caught in great abundance.

**Kosmerka and Ravna Islets** are a group of three or four small islets, of which the latter is 42 feet high, with sunken dangers near them extending together  $1\frac{1}{2}$  miles in a NW. and SE. direction. They lie more than two miles from the shore of Zuri island, and the eastern danger, a sunken rock, bears nearly E.  $\frac{3}{4}$  S. rather more than two miles from Lucietta light-house, and half a mile from Ravna islet. At  $1\frac{1}{2}$  miles to the SE. of Ravna islet is a rocky bank with  $6\frac{1}{2}$  fathoms water, and 10 and 11 fathoms around it. These islets and dangers are steep to, but it will be well to avoid them, and Lucietta light should be the guide.

The Nodre rock and Rapanjasnjak islet lie off the NW. end of Zuri, the former half a mile and the latter about two-thirds of a mile from the island. Lucietta light kept on a S.  $\frac{1}{4}$  W. bearing leads to the westward of the rock and islet.

**Saracino Cove** lies southeastward of the NW. extreme of Zuri, and though small is well sheltered from all but southerly winds; the anchorage is in 12 fathoms, in the middle of the cove.

**Stupica Bay.**—At  $1\frac{1}{2}$  miles westward of the SE. extreme of Zuri is Stupica bay, well protected from northerly and westerly, but exposed to southeasterly winds. The anchorage is at the entrance, in nine to 11 fathoms; farther in the depth is seven fathoms, and the bottom rocky.

The passage to Stupica bay is between Skervada and Bakalo islets; the former is connected to the shore by shoal water. A shoal lies more than 300 yards off the E. side of entrance. The position of the bay is indicated by an old castle, on a high, whitish hill.

**Masirina Islet**, close to the SE. end of Zuri, is 188 feet high, and clear of danger; but a rock above water lies off the S. extreme of Zuri.

**Port Zuri.**—The NE. coast, SE. of port Zuri, is quite exposed to the bora, from which it affords no shelter for the smallest vessel. Small vessels anchor off the village of Zuri, in 14 to 17 fathoms, sand and weed, and secure to the shore; the port is open to the NW. There is a mole, inside of which boats take refuge. Prastici rock, on which is a depth of nine feet, lies nearly a mile northwestward from the entrance of port Zuri, and is said to afford some protection from the swell from that quarter. Zuri may be recognized by some large store-houses on the sea side.

A rocky shoal, with  $3\frac{1}{2}$  fathoms, lies about a third of a mile northward of the NW. extreme of the island. Also, a rocky shoal partly above water, lies farther to the SE. about the same distance from the shore.

**Gerbosnjak Island**, 101 feet high and steep to on all sides, lies about a mile N. of Masirina. One mile W. of Gerbosnjak is the islet of Gus-tenjak surrounded by a four-fathom shoal, which has its greatest length in a northerly and southerly direction. Koromasne is an islet lying one-third of a mile NW. of the center of Zuri; it has deep water on all sides.

**Kakan Island**, which is between Zuri and Kapri islands, is composed of barren hillocks, with intervals covered with bushes, and is of less elevation than Zuri. Kakan rock lies a third of a mile off the NW. point of the island, with 11 fathoms water between.

The SW. coast affords no shelter whatever; a shoal with  $2\frac{1}{2}$  fathoms on it lies near its SW. extreme, and another shoal with two islets off its SE. extreme. The passage between Zuri and Kakan is called Zuri channel, and for its navigation the chart must be the guide.

In a little bay, in the middle of the NE. coast of Kakan island, anchorage will be found for small vessels in about nine fathoms, protected by islets on the N.

**Tatevisnjak and Ciablin Islets.**—These islets are the principal of a group of islets, shoals, and banks, extending five miles in a north-west-erly direction from Kakan island. Tatevisnjak the largest of the group, is circular, one-third of a mile in diameter, and 266 feet high; Ciablin, the next in size, and the northwestern islet, is 135 feet high. The smaller islets, rocks, and shoals are scattered between them and Kakan, and to the N. and W. of Ciablin, with deep water between them. The summit of Tatevisnjak bearing ESE.  $\frac{1}{4}$  E. will lead southward of these dangers, and Mertovnjak islet bearing S.  $\frac{1}{4}$  W. will lead westward of them. On the N. the coast of Morter island should be kept aboard.

**Kapri Island** is, like Kakan, composed of barren hills, the highest of which (500 feet above the sea) is to the southward. It is about  $3\frac{1}{2}$  miles in length, with an irregular coast line, and nearly united to Kakan; the narrow channel between is from seven to 11 fathoms deep, but seldom used, even by the native coasters, as the current through it is rapid.

Port Kapri, an inlet on the SW. side, is the only anchorage; the depth is about eight fathoms at the entrance, whence the decrease is gradual. It is well sheltered, being open only to the NW., and affords refuge to small vessels; near it is a little village.

The islets of **Percevac**, **Otocac**, and **Banjevac** lie off the NW. coast of Kapri at distances of a half and three-quarters of a mile.

**Zmajan Island**, when seen from the southward, has the appearance of a long hill, of which the highest part (499 feet) is to the NW. It is a little more than two miles in length, and its sides, which are steep-to, afford no shelter, except a small bay at the S. end. It forms, with Kapri, a narrow channel, which is rendered almost impassable by islets and shoals, among which the current sets with considerable velocity.

Six islets form a continuation for about  $3\frac{1}{2}$  miles to the SE. of Zmajan; they run parallel with Zlarin island, with which they form the channel of the same name. All these islets are of safe approach, excepting Komorica, 114 feet high, the southeastern, close to which is a rock awash.

Between Komorica and Duga islet, W. of it, is a shoal with  $3\frac{1}{2}$  fathoms water on it.

About a mile S. of Zmajan are two islands named Misiak, the westernmost being 242 feet high and the easternmost 177 feet; midway between them and Zmajan is a shoal with two fathoms of water, which has a sunken rock near the center of it. The small island of Ravna, surrounded by a shoal, is half a mile S. of Misiak islands.

**Bice Island**, nearly a mile northeastward of Zmajan, is formed by several conical hills covered with wood, the highest being at the N. end, and 332 feet above the sea. It is  $1\frac{1}{4}$  miles in length, and the shores are of bold approach. The channel between Bice and Zmajan islands is deep and clear.

**Zlarin Island**.—This island is  $3\frac{1}{2}$  miles in length, its northern part more than a mile in breadth, and in the middle of the SE. side rises 582 feet; it appears, when seen from the northeastward, to be covered with vines and olive trees; when seen from the opposite quarter it presents a very barren aspect. This island forms, with the islets extending to the SE. of Zmajan, Zlarin channel, which is about  $1\frac{1}{2}$  miles wide, with deep water throughout, except a rocky shoal with two fathoms water on it, lying in the middle of the channel between Sorella, the second islet SE. of Zmajan, and Zlarin island, and which is marked by a *white conical skeleton* buoy with a globe on top.

The NW. coast forms a triangular bay, which has a depth of  $5\frac{1}{2}$  and  $6\frac{1}{2}$  fathoms, mud, sand, and gravel. Boats find shelter in a cove near the village at the head of the bay. The village church is visible some distance seaward.

**Zlarin Channel**, which is formed by Bice and Zlarin islands to the NE., and Zmajan island and islets to the SE. of it on the SW., is the best and most frequented by vessels bound to Zara, and ports to the northward, from the neighborhood of Planka point.

Approaching it from southward and eastward, Komorica, the south-

eastern islet, 114 feet high, will be recognized, and the vessel should be steered mid-channel between it and Zlarin; when the S. end of Sorella islet bears WSW.  $\frac{1}{2}$  W., and is in line with the S. extreme of Ravna and Misiak islets, then close the shore of Zlarin to within one-third of a mile, and do not haul to port for the passage between Zmajan and Bice islands till the NW. extreme of Zlarin bears NE.  $\frac{3}{4}$  N.

**Provicio Island**, eastward of Bice, and  $1\frac{3}{4}$  miles in length, is generally lower than those in its vicinity, and is of more agreeable aspect, being covered with vines and fruit trees. Provicio village is at the SE. end, at the head of a bay which affords shelter to small craft only. There are many country houses here belonging to the inhabitants of Sebenico. The population is about 1,300, many of whom are fishermen, and great quantities of salt-fish are exported.

The shores are bordered by a narrow bank, except the SW., which is steep-to, but to the southward of Seporine village, on the W. side of the island, a rocky bank extends off nearly 400 yards, with  $3\frac{1}{2}$  fathoms water on it. In taking the passage between this island and the mainland, a mid-channel course should be preserved, as the shore on either side is bordered by shoal water.

This island forms with Bice a safe passage to the anchorage of Vodice.

**Anchorage.**—Vessels anchor off Seporine village, on the W. side of the island, in about 12 fathoms, sand; there is a fishing boat cove close to the village.

**Vodice Road.**—This anchorage, at the NE. end of Provicio island, is one of the best on the Dalmatian coast, and is much frequented, especially by vessels awaiting favorable weather to proceed through the narrow channel to port Sebenico. The anchorage is in eight or nine fathoms, sand, about midway between the village of Vodice and the NW. point of Provicio. Vessels of light draught anchor near the village eastward of the projecting point, preserving a distance of at least 400 yards from the shore, near which the bottom is rocky.

There is also anchorage farther westward, in seven fathoms, about 600 yards from the shore of Lukoran island; but between the two anchorages is a rocky bank with  $4\frac{1}{2}$  fathoms water on it, lying about one-third of a mile from the point W. of the village, and just outside a line between the W. extreme of the point and the SW. extreme of Provicio island. This shoal should be avoided.

The passage to Vodice road, when approaching from the eastward or southward, is between Bice and Provicio islands, and when from the westward between Bice and Lukoran islands, avoiding the extremes of both islands, or by the channel between Provicio and the mainland.

Vodice village is of considerable size and well built. About a mile

from it is the small village of Tribouhug, the birth-place of the celebrated extempore lyric poet Papizza, and where, as at Vodice, grows the cherry which produces the maraschino of Zara and Sebenico.

The shore between Vodice and Trebocconi town, about  $1\frac{1}{2}$  miles westward, is bordered by a bank, with  $3\frac{1}{2}$  fathoms water, at the distance of nearly 400 yards. Trebocconi town, which stands on a rocky projection 165 feet high, is connected by a swinging bridge with a point of the mainland; upon this high point is a church, which is a good mark for this part of the coast.

**Supplies.**—Here is a spring, from the abundance of whose waters Vodice derives its name; provisions can be obtained, and vessels frequently arrive from Sebenico for supplies of both.

**Sebenico Channel** is formed between Provicio and Zlarin islands on the one side, and the mainland on the other. The southern entrance between the SE. extreme of Zlarin and the coast is obstructed by several islets, between which are narrow passages. Krapano, bordering the main within the entrance, is the most remarkable of the islets in the neighborhood; it is well cultivated, and inhabited by about 150 persons, whose chief occupation is catching tunny fish. To the eastward of it is a narrow, shallow passage, with cliffy sides, to Andreis town and castle, and Morinje lake.

Vessels may anchor anywhere in the middle of the channel, in convenient depths and good holding ground, or, if apprehensive of a bora gale, close under the mainland.

**PORT SEBENICO** is a narrow basin  $5\frac{1}{2}$  miles in length, surrounded by high land and bordered by a rocky shore; the depth in it varies from 12 to 21 fathoms, soft mud. Vessels anchor where convenient a little to the NW. of the harbor light. There are several white buoys moored off the town for making fast to. The bora is severely felt, but the port is a good commodious anchorage.

The town of Sebenico is in the form of an amphitheater, and picturesquely situated close to the water, at the base of the barren Tartaro mountain, which at  $3\frac{1}{2}$  miles inland rises 1,653 feet above the sea. It was formerly considered the strongest city of Dalmatia, and in 1807 was unsuccessfully besieged by 40,000 Turks; but the town and fortifications are now almost in ruins; the cathedral is reckoned the oldest and finest in Dalmatia. It has about 10,000 inhabitants, who cultivate the vine and the olive on a not very fruitful soil, and export horses and cattle to Naples from Bosnia. There is a road leading to Zara, Spalato, and the interior of Dalmatia. The water supply is good and plentiful.

St. Pietro bay, at the SE. extreme of the basin, affords good shelter in  $6\frac{1}{2}$  fathoms, muddy bottom.

**Kerka River**, which discharges at the NW. part of the basin, has its source at the base of the Dinara mountains, and after receiving several mountain torrents forms, just before arriving at Scardona, a celebrated waterfall. It is navigable by small vessels as far up as Scardona village, once a large, handsome town, and between which and Bosnia there is still considerable commerce. Lake Proklian, which receives the waters of the Kerka and communicates with the basin of Sebenico three miles above the town, produces the *skilli*, a fish highly esteemed.

**San Antonio Chanel.**—This narrow channel leading to port Sebenico is between rocky cliffs; the breadth at the outer entrance, between the low Kobila rocks, nearly level with the water, is about 200 yards. This entrance is defended by St. Nicolo, a strong fort on one of the above rocks (within the outer rocks), with a line of embrasures at the edge of the water; the passage in, is between the beacon on the Kobila rocks and the fort on the starboard hand, and the light-house on the S. extreme of a small islet on the port hand. The NE. extreme of the shoal around the point, on the S. side of the inner entrance, is marked by a square stone beacon; the Kobila rocks at the outer entrance are marked by an angular pyramidal stone beacon 17 feet high.

**Tides.**—It is high water, full and change, at port Sebenico, at 6h. 26m.; the rise is about a foot.

**LIGHTS.**—At the S. end of the islet, on the N. side of entrance to San Antonio channel, is a light-house, which exhibits at 25 feet above the sea a *fixed red* light, visible five miles.

A harbor light is also shown from a small mole at the S. end of the town; the light is white to the northward and *red* to the southward; it is visible three miles.

**DIRECTIONS.**—There are three passages to San Antonio channel, the northern, the middle, and the southern.

The northern passage, between the mainland and Provicio island, has been already mentioned. In proceeding by this or by the middle passage to Sebenico, care must be taken not to stand for the entrance of San Antonio channel until well southeastward of the line joining St. Nicolo fort, with the N. extreme of Zlarin, in order to avoid the shoal extending southward from the N. side of entrance. In a vessel of heavy draught it will be necessary to steer well to the southeastward under the second hill (180 feet) of Zlarin island, and bring the N. extreme of fort St. Nicolo well open southward of the beacon on the Kobila rocks, so as to avoid the tail of the shoal extending southward from the N. side of entrance.

The middle passage, between Provicio and Zlarin islands, is less than 800 yards broad; the channel is between Lupaz islet on the N. and a



rock awash with a beacon on it on the S. Between the beacon and the N. extreme of Zlarin is a shoal with nine feet water on it.

The southern passage, between Zlarin on the W. and Duiuka and Dervenik on the E., is the best and the most frequented; it is very narrow, but short, and may be taken in a strong SW. wind, which would be favorable for running through San Antonio channel; and in bad weather from this quarter, which is here so common, a vessel may come to between Zlarin and the mainland, or bear-up for the anchorage at Vodice.

The position of Sebenico port and channel, may be recognized by an interruption in the line of islands and islets which almost continuously border the Dalmatian coast; also by Zuri, the outermost of the group of islands off it, and on a near approach, by Capočesto village church, which is visible at a considerable distance.

**Port Sebenico Vecchio** is formed by a long, hilly peninsula southward of Sebenico channel, and the mainland on the S.; it is a narrow inlet, about  $2\frac{1}{2}$  miles deep, with a depth of 25 fathoms at the entrance and 12 fathoms at about  $1\frac{1}{2}$  miles inside. Large vessels anchor at the latter locality. Northwestern winds raise a heavy sea near the entrance. This port is not often visited owing to the vicinity of port Sebenico, which is preferred to it. There is a village at the head of the inlet.

The island of Plana, 159 feet high, lies off the S. point of entrance.

Sebenico Vecchio may be recognized by a long, ancient wall on the heights; in proceeding to it a small vessel, under favorable circumstances, may pass on either side of Plana island. A rocky bank, with  $3\frac{1}{2}$  fathoms, lies southward of the SW. point of Plana; and the S. point of entrance to the inlet is bordered by shoal water with a rock on it.

The most populous and remarkable islands in the district of Sebenico, are: Provicio, Zlarin and Zuri. In these islands very good wine is produced, and fishing is carried on with great profit to the inhabitants. Provicio is very fertile. Zuri is well known by its numerous Roman ruins and the extensive coral fishery which was formerly carried on by the Neapolitans. Between Zuri and the mainland are several islands containing marble quarries.

**Port Capočesto**, about three miles southward of Sebenico Vecchio, is between the point upon which Capočesto village stands and the sugar-loaf shaped peninsula terminating in Kremic point to the southward. It is a semicircular bay, about half a mile wide, and the same deep, with from 12 to 16 fathoms in the center. It is a good, although small port, and vessels secure to the shore.

**Smokvica Island**, just N. of the entrance to port Capočesto, is connected with the mainland by a three-fathom shoal.

**Port Capočesto Islets.**—Between Capočesto and Planka point are several islets, rocks, and dangers known by this name. The largest of them, Maslinovac, 122 feet high, is about a mile to the SW. of the village, and half a mile westward of Kremic point. Vessels bound to Capočesto from the southward usually pass between this islet and Kremic point. A rocky shoal with  $2\frac{1}{2}$  fathoms water, which lies in the fairway of this passage, will be avoided by keeping close either to the E. side of the islet or to the main coast near the entrance of port Peles. Gerbovac islet has a shoal with one fathom water on it, lying nearly 600 yards to the SSE. of it; also a patch with  $3\frac{1}{2}$  fathoms, about a quarter of a mile off its NE. side. A rocky bank with  $5\frac{1}{2}$  fathoms on it lies  $1\frac{1}{2}$  miles SW.  $\frac{1}{4}$  W. of Gerbovac.

**Gerbovac Rock** is marked by an iron beacon with an *open-work globe and vane*. The beacon is 29 feet high and stands in one fathom of water, 600 yards SE.  $\frac{1}{4}$  S. of Gerbovac island.

Unless in a small vessel, with local knowledge, it would be prudent, when bound to Capočesto from the southward, to leave all these islets and dangers on the starboard hand.

**Port Peles.**—This little inlet, close to the southward of Kremic point, has a depth, in the middle of the N. branch of it, of seven fathoms, muddy bottom, where small craft may moor in safety. The southern branch, which is more contracted and less secure, is fit for boats only, which should moor under one of the points projecting from the S. shore, to shelter themselves from the sea sent in by westerly winds.

**PORT ROGOSNIZZA.**—This is a nearly circular, spacious bay close to the northward of Planka point, and surrounded by barren hills. It is divided into two parts by Rogosnizza islet, on the NW. side of which is the village.

Vessels anchor off the village in 12 to 17 fathoms, or between the N. part of Rogosnizza islet and the mainland E. of it, in 15 to 17 fathoms, mud, sand, and weed, or farther up, in from 10 to 12 fathoms. Vessels may safely heave-down in this port for repairs. Small craft moor on the W. side of the islet and secure to the shore at the S. part of the village. Port Rogosnizza is safe in all winds, and the entrance is easy. The surrounding country is very barren. Fossil remains are numerous at Rogosnizza; also at several of the islets in its neighborhood. Water may be obtained from the mainland.

**Mulo Islet.**—This islet, a little more than 100 yards in diameter, 51 feet high, and the outermost off port Rogosnizza, lies  $1\frac{1}{2}$  miles west-

ward of the entrance. It is nearly steep except on the N. side, which is rocky 100 yards off, and has a white light-house on it.

**LIGHT.**—The light-house on Mulo islet exhibits at 73 feet above the sea a *fixed* white light, visible from a distance of 14 miles.

**Spaun Rock.**—At the distance of nearly a mile N. by W.  $\frac{3}{4}$  W. from Mulo light-house is a rocky shoal about 300 yards in extent, with three and four fathoms water on it, and six to eight fathoms around it; in the center of the shoal is Spaun rock, with only two fathoms on it. The S. extreme of Rogosnizza islet in line with Belirat, the N. point of entrance to port Rogosnizza, leads 600 yards N. of the rock. To pass S. of the rock keep the N. extreme of Kona point, on the S. side of entrance to port Rogosnizza, in line with the N. extreme of the N. Smokvica islet, and pass within half a mile of Mulo light-house.

**Smokvica Islets.**—Two islets, about 300 yards apart, with seven to 14 fathoms between them, lie off the S. point of entrance to port Rogosnizza; the larger of the two is to the southward, and 176 feet high. Shoal water extends more than 200 yards from the NW. end of each islet; and a third of a mile NW. by W.  $\frac{1}{2}$  W. from the center of the N. islet is a three-fathom rocky patch.

Off the S. end of the larger of the Smokvica islets, to the northeastward of it, is a small islet, between which and the mainland is a deep passage about 400 yards wide, which leads into port Rogosnizza.

**DIRECTIONS.**—To enter port Rogosnizza, the entrance of which is open to the westward, a large vessel should pass outside the islets. To go in N. of the Spaun rock, keep the S. end of Rogosnizza islet shut in with the N. point of the bay until Mulo light-house bears about S.  $\frac{1}{4}$  W.; then steer as convenient. To enter the port S. of the Spaun, steer for Mulo light-house, pass at a prudent distance on either side of it; and then, in order to avoid the three-fathom patch to the NW. of the N. Smokvica, bring the light-house to bear SW.  $\frac{3}{4}$  S. and steer NE.  $\frac{3}{4}$  N. until the S. end of Rogosnizza island bears ESE.  $\frac{3}{4}$  E.; then steer for it. A small vessel may take the narrow passage between the S. point of entrance to the port and the islets off it, but should guard against the current, and be prepared to anchor immediately.

## CHAPTER X.

### COAST OF DALMATIA FROM PLANKA POINT TO STAGNO PICOLO, AND ADJACENT ISLANDS.

VARIAION in 1883.

Planka point  $9^{\circ} 39' \text{ W.}$

Lissa, west end,  $9^{\circ} 24' \text{ W.}$

Narenta channel  $8^{\circ} 49' \text{ W.}$

Pomo islet  $9^{\circ} 34' \text{ W.}$

The above limits include an extent of about 100 miles of the Dalmatian coast and the adjacent islands. This coast presents a diversified appearance of fertile, well-cultivated country, and dry barren shores, with high, bare-topped mountains in the rear.

The islands eastward of Planka point, which form the third group, instead of trending parallel with the coast, as those described in the previous chapter, lie more at right angles to it in an E. and W. direction. The olive and the vine are cultivated on them, and fishing is carried on in the numerous and productive channels. Few of the islands afford fresh water.

**PLANKA POINT**, which lies  $2\frac{1}{2}$  miles to the SE. of Mulo lighthouse, is composed of white rocks, and, like the adjacent shores, steep and inaccessible; off it is a low rock, nearly even with the water's edge. On its S. extreme are the ruins of a small church, and close to the northward, mount Movar, of barren and whitish aspect, with a stone pile on it, 432 feet above the sea. Vessels often make this point on their way up the Adriatic.

The currents are rapid in its vicinity, and sea winds cause considerable eddies around it.

**Trau Vecchio Bay.**—Between Planka point and Zirona channel the coast forms three rather deep bays, with steep, rocky shores, which afford shelter from all but westerly winds. The largest and best of these is Trau Vecchio, which is open to the SW., and in which vessels anchor in 11 to 17 fathoms water, sand. There are three or four small islets fronting these bay, of which St. Arcangelo, 295 feet high, is the largest, and lies about a quarter of a mile off the E. point of Trau Vecchio bay.

There are safe passages between the two small Muja islets W. of St. Arcangelo islet, between them and the latter islet, and between them and the coast.

St. Arcangelo islet is a good distinguishing mark for the bay, being covered with trees and surmounted by a tower and the ruins of a chapel. At the head of Trau Vecchio are the ruins of ancient Trau.

If, in a small vessel, Trau Vecchio anchorage should be missed in running from the northward for shelter eastward of Planka point, proceed through Zirona channel to port St. Giorgio, in Great Zirona island.

**Port Mandoler** is a narrow inlet in the mainland opposite Great Zirona island; it runs in about a mile to the NW., and affords shelter to small vessels from all winds, in from four to 10 fathoms, abreast of some dwellings on the northern shore. Off the mouth of the port is the small Mandoler islet, either side of which may be taken on entering.

**Little Zirona Island** is 295 feet high, barren at the summit, with cultivated patches below. It is of bold approach, except on its NW. side, which is foul. Temporary shelter from a bora gale may be obtained in Rina road, under its SW. side, in eight or nine fathoms, sand and weeds.

**Great Zirona Island** is three miles in length in an E. and W. direction, and its NE. part 575 feet high. It resembles Little Zirona as to cultivation of the lower grounds and barrenness above. Off the E. extreme are two small islets close to the shore, and connected to it and to each other by shoal water; the rest of the coast is quite clear. There are about 1,200 inhabitants, who cultivate the vine, the fig, and the almond.

**Port St. Giorgio**, on the NW. side of Great Zirona island, affords good anchorage. Vessels of moderate size anchor near the middle of the port, in 13 to 16 fathoms, sand, and secure to the shore. The two points forming the entrance of the port are high and covered with trees; on the starboard hand is a church, which is visible some distance. The town is at the head of the port, and water and provisions in small quantities may be obtained.

The little islet of Malta, 90 feet high, lies about half a mile westward of the S. point of entrance to the port.

**ZIRONA CHANNEL** is the passage between the Zirona islands and the mainland, which is about a mile wide, with deep water. At the W. entrance is the small Muvrica islet, 92 feet high, around which shoal water extends about 100 yards.

In taking the W. entrance, a vessel should pass between Muvrica islet and Little Zirona, being a straight course, but the shore of the mainland is all along clear and bold. In taking the E. entrance, the shore of Great Zirona island should be closed, in order to leave on the starboard hand the chain of small islets and rocks fronting the entrance

to Bossiljina bay. Violent squalls reach this channel, especially in southeasterly winds; these winds greatly accelerate the current through it.

There is a narrow passage between the two Zirona islands, but it is seldom used, as the current causes considerable eddies in it.

**Kluda Islets.**—A chain of small islets and rocks, extending E. and W. over a space of  $1\frac{3}{4}$  miles, lies on the N. side of Zirona channel opposite Great Zirona island, and in front of the entrance to Bossiljina bay. The largest of these islets is named Kluda, at the W. end of the group, and 245 feet high; they should not be approached too close. At a long half mile westward of them are two shoals with five and  $5\frac{1}{2}$  fathoms water on them.

**Bossiljina Bay** is an inlet of the sea, extending westward about three miles, and generally about half a mile wide. It is completely sheltered by the high land, which rises 968 feet above the sea, at  $1\frac{1}{2}$  miles W. of the point of entrance, and its shores are backed on the N. by high, wooded, mountainous land, the seaward slopes of which are planted with vine and olive trees. The village is at the head of the inlet. In the middle, about half way in, the depth is 12 fathoms, from which the decrease is gradual towards the village. Vessels anchor half way between the two shores, in seven or eight fathoms. Small craft moor in the various little creeks and abreast of the village.

It is difficult with contrary winds to work into this bay, in consequence of the outlying islets and rocks outside and within the entrance, and impracticable for a sailing vessel with winds between NE. and SE. to quit it. For these reasons, Bossiljina bay is seldom visited by other than coasters. The passage into the bay is about half a mile wide, between the W. point of entrance and the Celiui rock, and shoals on the NE.

**Bua Island** is about  $8\frac{1}{2}$  miles in length E. and W., and in the center 738 feet high; it is connected with the town of Trau by a swinging bridge, which permits the passage of vessels under 15 feet draught. Its appearance presents nothing remarkable; the higher parts are rocky and bare, the lower ground is well cultivated, and produces wine, oil, and fruit. There are four villages, and about 1,600 inhabitants, besides the town of Trau at the nearest point of the mainland. On the W. side of the island is a cove, where a great quantity of asphaltum exudes. The S. coast, which runs parallel with the mainland, is rocky and steep almost throughout, with deep water close-to.

**St. Eufemia Anchorage** is inside the islet of this name, near the western extreme of Bua, and is frequented by small craft, which anchor in seven to nine fathoms. This anchorage is convenient for vessels meeting a contrary wind in Spalato channel. It has an eastern and a

western entrance; the former is over a shoal, with only two fathoms on it, which unites St. Eufemia with Bua island.

**Saldon Bay** is formed by an indentation  $2\frac{1}{4}$  miles deep, on the W. side of Bua, and communicates with Canale Castelli by the Trau channel. Vessels of large draught anchor near the middle, in 14 fathoms, mud and gravel, with the N. point of the bay bearing about N. by W.  $\frac{1}{4}$  W. Small vessels find good anchorage under the northern and southern shores.

The Celini rock, 45 feet above water, with four shoal rocky patches, encumber the entrance to the bay for vessels of large draught; the passage in is between the above rock and a four-fathom shoal patch on one side, and the point of entrance, from which a shoal extends 200 yards westward, on the other. The shoal patches to the NE. of the Celini rock have five and two fathoms water on them; the latter depth is near the N. shore.

**Trau Channel** is formed by the narrow space which separates the NW. side of Bua island from the mainland. Vessels of light draught anchor between the island and the mainland, muddy bottom, and make fast to the island.

**Trau**, ancient *Tragurium*, is built on an islet communicating with the mainland by a bridge over a ditch which dries at low water; and is also connected to Bua island by two jetties, one running out from Trau, the other from the island, and joined by a bridge; under the latter the depth is about 18 feet. It is surrounded by ancient walls and defended by a strong castle. The neighboring country is well cultivated and picturesque; the inhabitants, about 4,000, are industrious, and many of them good sailors. Surrounding marshes and the muddy bed of the channel between the town and the mainland at low water render the atmosphere unwholesome. Pliny alludes to the marble of *Tragurium*.

The trade is in wine, oil, and fruit; water and provisions may be obtained, and vessels repaired.

A *fixed red* light is shown near the bridge which joins Bua island to Trau.

**Directions.**—When approaching the anchorages of Bossiljina, Saldon, or Trau from any quarter, mount Vlaska, 1,476 feet high, which is one of the highest points on the Dalmatian shore, and two miles westward of of Trau, will be easily recognized. It is of barren aspect, and surmounted by the ruins of a telegraph tower.

In making for Trau channel, a vessel should round the W. end of Bua island at the distance of 400 yards, and steer between Seghetto and the NW. point of Bua; when entering the channel give the N.

shore of the point a berth of more than 100 yards; the shoal bordering the point extends westward beyond this distance. The shore bank N. of the point extends off about 250 yards, with about six feet water on its edge. The anchor should be dropped in five fathoms, 300 yards eastward of the point. Farther in the water becomes shoal, but 15 feet can be carried through the channel to Canale Castelli. The shore bank off the town on Bua island is marked by beacons, and also the channel E. of the bridge on either side.

When approaching by Spalato channel, the opening between Jelinac point on the W. and the extreme of Bua island on the E. will be easily recognized. After passing the Macina shoal, which lies near the center of Spalato channel, the W. end of Bua should be steered for, and the three islets, St. Eufemia, Krajevace, and Zaporinovac, left on the starboard hand, the latter being passed at a short distance, in order to avoid the Bazion rock or islet, lying half a mile to the westward. When the hilly Vranica point, which is on the right of the entrance to Bossiljina bay, and immediately opposite the passage, is seen, it should be steered for, and the Celini rock will soon be visible; the latter should not be passed too close, but should be left on the starboard hand if bound to Bossiljina bay, and on the port hand if going to Trau or Saldon anchorages.

**CANALE CASTELLI** or bay, formed within the NE. side of Bua island and the NW. side of Spalato promontory, extends from the village of Vranica on the E. to the town of Trau on the W., over a space of about nine miles. The northern coast is bordered by a bank extending more or less from the shore, and numerous rocks and shoals encumber the eastern part of the bay, rendering caution necessary in the approach to Vranica and port Paludi. It is sheltered from the violence of northerly winds by the high land near the coast, but not free from the bora gales; the shore of Bua island, between its E. extreme and the town of Trau, being quite exposed affords no shelter.

Salona, at the E. extreme of the bay, stands on the ruins of ancient *Salona*, the birth-place of Diocletian, it is now an insignificant, but picturesque village. The small river of this name, which is navigable for boats, and whose source is at the foot of the Klissa mountains, discharges here. There are several villages along the coast of the bay, with "Castel" preceding the name, hence the name of the bay. A stone beacon, marking a shoal, in about five feet water, and six feet high, stands about 45 yards W. of Castel Vecchio.

A rocky shoal with  $3\frac{1}{2}$  fathoms water on it lies halfway between the E. extreme of Bua island and the town of Trau, and about 1,100 yards from the shore of Bua. To the westward of this shoal the shore on either side converges and is bordered by banks, forming Trau channel,



which, for about three-quarters of a mile from Trau is marked by beacons, and carries 15 feet water up to the bridge and through to Saldon bay.

**Galera Rock.**—At about half a mile northward of the N. point of Paludi bay is the Galera rock, six feet above the sea; reefs, in the center of which the sea breaks, with deep water between them, extend nearly half a mile westward of the rock. At half a mile to the eastward of Galera rock is a shoal, upon which is a stone beacon in the form of a truncated cone  $7\frac{1}{2}$  feet above the sea, surmounted by a staff and ball painted *red*, and shoal water around it extending over a space of more than 200 yards. Thence to the anchorage N. of Vranica village the center of the passage is clear; to the rocks on the N. side give a berth of 300 yards.

**Port Paludi.**—The bay on the N. side of Spalato promontory, under mount Marian, is called port Paludi; it is bordered all round with shallow water, and in the middle of the bay is a rocky shoal about 400 yards in extent E. and W., with as little as one fathom water on its outer end, which is marked by a beacon bell-buoy. Also, a large rock, about six feet above water, lies 400 yards W. of the N. point, with from four to six fathoms water between. Within the shoal there are from four to six fathoms water, and anchorage for small vessels in the N. part of the bay, about a quarter of a mile off the jetty, from which a road leads to the town of Spalato on the S.

Large vessels anchor about a third of a mile off the rock, and a half a mile N. of the SW. point of the bay, in about 17 fathoms, mud.

**Directions.**—The principal entrance to Canale Castelli is between Jove point, the E. extreme of Bua, and St. Giorgio point, the W. extreme of Spalato promontory, where four fathoms water will be found at 100 yards from the point. This entrance is about a mile wide, and free from danger, but in working through in a bora, which at times blows heavily, a vessel should be prepared for heavy squalls from the high land.

The position of the bay is plainly indicated by mount Marian, 598 feet high, rising from the Spalato promontory,  $1\frac{1}{2}$  miles nearly, eastward of the E. point of entrance; the mount is barren, and appears from the offing to be detached from the adjacent ground.

The passage from Canale Castelli through Trau channel can be taken by vessels of light draught.

**PORT SPALATO** (Slavonic *Split*) is two miles eastward of St. Giorgio point; the intervening shore is rocky and steep-to, except a small shoal from the point about two-thirds of a mile from that of St. Giorgio.

The port of Spalato is a bay about 1,200 yards wide, and 800 yards deep, with four and five fathoms water over mud in the center, shoaling

to  $1\frac{1}{2}$  fathoms rocky bottom at 200 yards from its head, and to nearly the same distance from the western shore, which is irregular and rocky.

From the eastern point of entrance a mole projects about 450 yards towards the western point, affording considerable protection to the port; from the inner or easter part of the mole, a wall extends along the E. shore of the port, and terminates at a small inner mole (where the lazaretto is situated), which covers an area, four to nine feet deep, about 150 yards in length.

The town of Spalato, which contains the ruins of the palace of Diocletian is the capital of the department of Spalato, and the most important town of Dalmatia; its population is estimated at about 11,000 persons. The adjacent country contains several suburbs, is very fertile, and richly cultivated. Horses, cattle, wool, cotton, silk, figs, bees-wax, and copper are the exports; timber for ship-building is grown, and near the town among the vines is a wild cherry, from which is extracted the maraschino of Zara. Spalato is the chief outlet for the produce of Bosnia, and is defended by imposing fortifications.

The outer walls of Diocletian's palace, which formed a square, still contain a large part of the town, and are in a measure yet existing. The cathedral is octagonal with a curious portico round it, and inside are two ranges of columns of granite and porphyry, one above the other, with a gallery between them, in which a whispering echo is observed. Other considerable remains of Imperial buildings are seen within the precincts of the town.

**Supplies.**—Water and provisions may be obtained in abundance. There are facilities for heaving down and repairing vessels.

**LIGHTS.**—From the outer extremity of the breakwater at Spalato, at an elevation of 35 feet above the level of the sea, is exhibited from an iron tower a light of the 5th order, which is *fixed* 30 seconds and *flashing* 30 seconds alternately. This light shows white from N.  $65^{\circ}$  W. to N.  $80^{\circ}$  E.; *red* from N.  $80^{\circ}$  E. to S.  $62^{\circ}$  E. in the direction of Santo Stefano point; and white from S.  $62^{\circ}$  E. to S.  $83^{\circ}$  W.

A *fixed* light showing *red* to seaward and white in-shore, is also exhibited in the port from the head of the mole near the lazaretto, visible five miles.

At the landing near the railway station on the E. side of the port, is a white light with a *red* sector in the middle.

**Buoys.**—The western extremity of a reef, in the SE. corner of the port, is marked by a beacon buoy; and a shoal in the NE. corner has also a similar buoy on it. Three or four other buoys are laid down for warping or making fast to.

Floating beacons are moored on the different shoals in the port.

These beacons are wood, of pyramidal form, painted white, and having on them in black characters the depth of water at the points where they are located.

**Mount Marian** on the W., and Klissa castle on the E., are good guides to the port at a distance; at a nearer approach the numerous edifices and steeples of the town will be seen. Klissa castle is about four miles to the NE. of Salona, and is supposed to be the ancient *Andremetum*; it is very strong, both by nature and artificially, and completely commands the defile between the mountains.

If a vessel in this neighborhood should be unable when caught in a bora gale to reach either port Spalato or an anchorage in Canale Castilli she should bear-up for the W. side of Brazza island.

**SOLTA ISLAND.**—This island is 10 miles in length, and averages about two miles in breadth except towards its S. end, where it is narrower. It consists of numerous rocky hillocks partially wooded; mount Straza, 716 feet high, about one-third from the W. end and on the S. side, has the remains of a telegraph station on it; but its highest part is mount Superior, 767 feet above the sea, about one-fourth from the SE. end. Solta contains about 2,200 inhabitants; it affords some excellent pasturage, many parts are well cultivated and produce wine and oil, also honey of exquisite flavor.

Along the SW. coast, which is rocky and steep, are several little coves, but completely exposed to sea-winds, from which they afford no shelter whatever.

At the western extreme, off which lie several rocky islets, are two inlets, in the northern of which small vessels find shelter from all weathers; and off the southern, between the points of the bay and Balcon islet, there is temporary anchorage for small vessels from N. and easterly winds.

**Port Oliveto**, ancient *Olynta*, is the most northern of the above inlets. When bound to this port from northward, the passage between Stipanska and Zelebranjak islets should be taken, and the vessels should keep along the western side of the latter and haul to port after passing it. Stipanska, 267 feet high, is the largest and outermost of the group of these islets, and is planted with olive trees. When bound to the port from the southward, Balcon islet should be steered for, and the passage taken between it and the high point of Solta, upon which is a church. Balcon is next in size to Stipanska islet, and is covered with brush-wood. In taking this course, Rotol islet, the southwestern of the group, should be allowed a berth of more than 200 yards in passing it. The little islet of Kamicic, 61 feet above the sea, should also be avoided on the W. side. The village of Oliveto is at the head of the port.

**LIGHT.**—A *fixed* white and *red* dioptric light, is exhibited from a white masonry tower situated about 50 feet from the water's edge, on Point San Nicolo di Oliveto, W. coast of Solta island. The *red* sector illuminates an arc of  $45^{\circ}$  comprised between a line passing over the center of Balcon rock, and a line passing 220 yards to the eastward of Kamicic rock. The light is elevated 35 feet above the level of the sea and is visible three miles.

Although this light illuminates the narrow and shallow passage between Zelebranjak rock and Solta island, vessels bound for Oliveto, through Solta channel, should pass between Zelebranjak and Stipeka.

**Karober Cove** lies at about the middle of the N. coast of Solta, and is frequented by coasters, which anchor in the center of it, and secure to the shore, near some store-houses. The position is easily recognized by a precipitous point 669 feet high, covered with vines, contiguous to a tract of low land; and on a near approach a grotto will be seen at the western point of the port.

**Port Sordo**, which is close to the eastward of Karober cove, is used in southerly and westerly winds, by larger vessels than those frequenting the latter. The port is nearly a mile deep, and the anchorage is in from nine to 15 fathoms, muddy bottom, and somewhat protected from the NE. quarter.

The N. coast of the island is exposed to the full force of northerly and northeasterly winds, and the two last mentioned ports are the only places affording any shelter whatever.

**SOLTA CHANNEL.**—In taking this passage to Spalato channel, between Solta and Great Zirona islands, the eastern extreme of the latter, should be avoided, as the current, which is rapid and irregular in branching off to Zirona and Solta channels, sometimes sets upon it.

A rocky shoal with  $3\frac{1}{2}$  fathoms water on it, lies almost in a direct line between Stipanska and Macaknar islet at the E. end of Orut, also a  $5\frac{1}{2}$  fathom patch, in the N. part of Solta channel.

The passage is between Orut and Stipanska islets, as close as possible to the latter, after passing which, Solta should be closed, in order to avoid being carried by the current near Macina shoal.

**SPALATO PASSAGE** which is the shortest route to the ports in Spalato channel, separates Solta and Brazza islands; being less than 800 yards wide, it is of rather difficult navigation with contrary winds when the current is strong; the shore on either side should not be approached within 100 yards, the Brazza side being preferred. When passing through from southward, Smerduglia islet 22 feet high, will be seen at the N. entrance.

When making for this passage from Spalato channel, it is customary

to leave Smerduglia islet on the port hand, and care must be taken not to enter Milnà bay, which lies southeastward of it in Brazza island, and which is sometimes mistaken for the strait.

**LIGHT.**—At Juja, the SW. point of Brazza island, is a white light-house, which exhibits at 55 feet above the sea a *fixed* white light, visible nine miles.

**SPALATO CHANNEL.**—The breadth of this channel between Zirona and Solta islands on the S., and Bua and the coast of Spalato on the N., renders it easily navigable, as the current, which sets to the westward, is not very rapid. The average depth may be about 30 fathoms, and the bottom throughout is mud.

**Macina Shoal.**—This dangerous rocky shoal, at a depth of four feet, is the only danger in the channel; it lies nearly opposite the N. entrance to Solta channel, about midway between the shore of Solta island and St. Eufemia islet. Well-constructed beacons have from time to time been erected to mark the position of this shoal, but they have as often been washed away, and therefore the utmost caution is necessary when in this locality. An iron staff and skeleton ball at present marks this danger.

**The Coast** between port Spalato and Stobrez village, four miles eastward, is inaccessible, and bordered by high land; about midway, at a few yards from the shore, is a small five-fathom shoal, which is supposed to be the remains of an ancient dock. Between the village and a point two miles westward a bank extends  $2\frac{1}{2}$  miles to the SW., the general depth on it being from six to 10 fathoms, but in two places, at one mile, and nearly two miles from the shore, there are patches of five fathoms. At about three-quarters of a mile eastward of the tail of this bank is another bank with  $6\frac{1}{2}$  to 10 fathoms water on it.

Stobrez village—the site of the ancient *Epezio*—stands upon a projecting point forming the W. side of the cove of the same name, and is visible at some distance.

Stobrez cove is a small indentation into which the river Xernovica empties, and on the eastern side of the cove small vessels anchor; the NW. side is shoal. The bora blows severely here.

A telegraphic cable runs from monte Grosso point  $2\frac{3}{4}$  miles eastward of Stobrez bay to Vela Luka cove in Brazza island.

The coast between Stobrez cove and Almissa road, eight miles southeastward, is accessible throughout. The country for about a mile inland is richly cultivated, with numerous dwellings here and there. Oil, wine, and maraschino are the products. The land rises abruptly at the margin of this cultivated ground, to rocky mountains of whitish

aspect, which afford protection from northerly winds to the vegetation below.

**Anchorage** in good holding ground may be obtained during a bora gale all along, and at a short distance from this shore; but not near Lunga point, which projects and is bordered with shallow water, nor near any other of the salient points.

**ALMISSA ROAD.**—Between Lunga point and Mala Luka cove, three miles to the SE., the shore falls back nearly a mile, and in the bight which it forms is Almissa road. The anchorage is off the monastery on the shore about half a mile southeastward of the town, in about 14 fathoms mud; vessels of light draught moor near the shore, to which they secure against the bora, which wind, however, does not blow so violently here as on other parts of the coast.

The NW. shore of the road is bordered all along by a bank which extends off more than a third of a mile and is steep-to; the bank is the deposit from the Cetina river, has only two fathoms water on its edge, and 12 fathoms alongside it close up to the head of the port.

The town of Almissa—ancient *Onacum*—is on the left bank, at the entrance of Cetina river, and at the foot of a mountain, surmounted by an old castle. It was formerly a considerable and fortified place, and was destroyed by the Venetians, owing to the piratical practices of the inhabitants; it is now almost deserted, being rendered very insalubrious by neighboring marshes.

The Mossor range of mountains at about  $2\frac{1}{2}$  miles N.  $\frac{1}{4}$  E. of Almissa rise 4,618 feet above the sea. Mount Borak (2,855 feet), two miles southeastward of Almissa, and about a mile from the sea, marks the position of the town and anchorage. Its peaked summit of naked rock commands an extensive view of the surrounding country.

When Lloyd's steamer is expected, a red light is shown from near the St. Francesco convent, visible two miles.

**Cetina River**—ancient *Nestus*—is one of the chief rivers of Dalmatia; its source is at the base of mounts Dinara and Ghgnat on the Bosnia frontier, whence it flows through Sign and Trigl, near Duare castle, where it forms the finest of its several cascades, and thence through Vissech to the sea near Almissa. It is navigable by boats drawing about three feet as far as the mills of Vissech; the bar, over which there is a little more than three feet, is winding and difficult for strangers.

**The COAST** from the base of mount Borak trends E.  $\frac{3}{4}$  S.  $7\frac{1}{2}$  miles to Vrullja cove, and then SE.  $\frac{1}{4}$  S.  $8\frac{1}{2}$  miles to port Makarska. It is backed at a few miles inland by high rocky mountains. At Vrullja is a sudden depression of the land, southward of which the latter rises to

a still greater elevation than before, which is maintained as far as the mouths of Narenta river. The low grounds between the mountains and the sea are generally cultivated and contain several villages, of which Rogosnica, on an eminence two miles SE. of mount Borak, is the most conspicuous, being visible from a considerable distance along the sea-shore on either side of it.

There is no safe anchorage between the mount and Vrullja. Vrullja cove is dangerous, and also difficult of approach, owing to strong eddies caused by subaqueous springs; the depth near it is considerable, being 39 fathoms at the entrance, and 22 fathoms close to the shore. The bora rushes with violence through the valley. The land in the vicinity has a barren, desolate appearance.

Between Vrullja cove and the town of Makarska the coast has the same appearance. Vessels anchor for shelter from the bora under the southeastern shore of a small bend of the coast at Brelle village, and at Soline and Baskavoda coves close to the shore, to which the cables are secured.

Water may be obtained at Baskavoda from springs.

**PORT MAKARSKA.**—This little port, with  $1\frac{1}{2}$  to six fathoms water, mud bottom, is used by vessels of moderate size; coasters anchor on the NW. side, and make fast to piles on the beach. It is sheltered on the SW. quarter by a peninsular rocky point, but it is visited by heavy bora squalls from the high land in its rear.

The small town—ancient *Albius*—which is close to the water and rather picturesque, communicates with Spalato, 30 miles distant, by a road which passes Almissa, and follows, generally, the trend of the coast; the town carries on a small trade with Turkey.

Water and fresh provisions may be obtained, and there are facilities for repairing small vessels.

**LIGHT.**—A *fixed* light, *red* seaward and white towards the port, is shown from the mole head at Makarska, visible two miles. The light will be seen from the NW., over the low neck of land joining the peninsula to the mainland.

**Mount Biokovo**, 5,793 feet above the sea, is the highest and most remarkable of the mountains in the neighborhood of Makarska, and like the others, the upper portion is whitish and destitute of vegetation. When it is enveloped in fog, which rises in a scattered form, a strong N. wind may be expected.

**BRAZZA ISLAND.**—This island, one of the richest and most populous of the Dalmatian islands, is 21 miles in length, seven miles at its greatest breadth, and its W. end nearly five miles N. and S. The S. side is mountainous and the most elevated, and when about the middle,

mount St. Vito rises 2,570 feet above the sea, the slope towards the N. shore is gradual. The hills are well wooded, and afford good pasturage. The lower grounds are well cultivated, and produce wheat, wood, oil, wine and firewood. It contains 19 villages and about 16,000 inhabitants, who are very industrious and make good sailors. Bol, the chief village, is close to the sea near the middle of the S. coast.

The E. extreme of the island is about three miles from the mainland, and the SW. extreme less than 800 yards from Solta island. A telegraphic cable runs from Vela Luka cove on the N. coast, to Monte Grosso point on the mainland; and from Bol on the S. coast, to Chiave the bay next W. of Oskoracia cove, Lesina island.

**St. Stefana**, a small bay under St. Giorgio point the NW. extreme of Brazza, is the northernmost of the anchorages on this coast, which afford good shelter from the bora; the depth is 11 fathoms, mud, but the space is sufficient for two or three vessels only. Vessels of any size may safely anchor in northeasterly winds, outside the bay southward of the point at the left of its entrance.

**Bobovisce Cove**, a long mile southward of St. Stefana and beyond a bluff, steep rocky point covered with wood, affords shelter at its entrance; in a bora, vessels of very light draught anchor inside, and make fast to the shore near the village. This anchorage, as well as that of St. Stefana, is difficult to reach in easterly, and both are exposed to westerly winds.

**Port Milna**, which is the best of the Brazza ports, is protected from all but N. and northwesterly winds; it is considered an excellent anchorage with room for several vessels. The outer anchorage is between Zaglava point and the entrance, in from 14 to 19 fathoms. Small vessels anchor in the middle of the inlet, which is about three-quarters of a mile deep. at the head of which is the village.

Small supplies may be obtained at the village, and slight repairs made.

**LIGHT.**—A light is shown from a small stone tower on Biaka point, at the entrance to the harbor of Milna, Brazza island. The light is *fixed red*, dioptric, with a *green* sector of 13° over Smerduglia shoal.

St. Giovanni village is two miles from the W. end; there is no port, but at about half a mile from the shore, there are 17 and 18 fathoms water where vessels can anchor temporarily.

**LIGHT.**—A *fixed red* dioptric light is exhibited on the SW. angle of the extremity of the mole at San Giovanni, Brazza island. It is shown from a wooden post, is elevated 18 feet above high water and 16 feet above the ground, and is visible three miles.



**Port St. Pietro**, about  $5\frac{1}{2}$  miles from the western extreme, is the chief of the small ports or coves on the N. coast of Brazza, and is protected by a mole. Its position is denoted by a small church on the W. point of the port, and by the village, which is on an eminence. At half a mile off the shore and fronting the port there is a patch with three fathoms water.

**LIGHT.**—On the mole head at port St. Pietro, is a small stone turret, 21 feet high, which exhibits a *fixed green* light, visible from a distance of five miles.

**Postire.**—Three miles to the eastward of port St. Pietro, is the town of Postire, situated on a small bay, which is partially protected from seaward by a dike.

A *fixed* white light, elevated 15 feet above high water, and visible from a distance of five miles, is shown from a wooden post, placed on the extremity of the dike, at Postire.

**Port Pucisce**,  $8\frac{1}{2}$  miles eastward of St. Pietro, is a narrow inlet about two-thirds of a mile deep, with 17 fathoms water at the entrance, to three fathoms in to the village at its head.

**LIGHT.**—A *fixed red* dioptric light is exhibited from the tower of the church of San Nicolo, on San Nicolo point, to the westward of the entrance to Port Pucisce, Brazza island.

The light is elevated 45 feet above high water, and 29 feet above the ground, and is visible three miles.

**Luka Cove**, four miles farther on, and the same distance from the E. extreme of the island, is an inlet running more than a mile to the westward somewhat in the direction of the island, with eight and nine fathoms water near its head; being open to eastward it is exposed to winds from that quarter.

At the entrance, Povie cove with from nine to 12 fathoms, but not so deep as Luka, extends SE. to the village of the same name. In this latter cove there is anchorage for small vessels, which is sheltered from the eastward.

There are other small coves along the N. coast of Brazza, frequented by boats which carry on trade with the mainland.

**LIGHT.**—On point San Antonio, the eastern point at the port of Povie, is exhibited from a white masonry tower at an elevation of 23 feet above high water, a *fixed* white dioptric light, visible five miles. Vessels entering or leaving the port should pass the point on which the light is situated at a distance of about 200 yards.

**Port St. Martino**, at the SE. end of Brazza, affords protection for small vessels from the bora, in about seven fathoms mud, on the W. side of a headland which forms the port. Vessels of light draught

anchor farther in. The woods on this part of the island are considered to break, to a great degree, the force of the bora.

St. Rocco point, upon which is a church, is two miles southward of cape Planche the E. extreme of the island, and about half a mile NE. of the entrance to the port, and sufficiently indicates its position.

**LIGHT.**—At San Martino the light is *fixed* white, dioptric, and is shown from a small stone tower on the SE. side of the keeper's dwelling, on the point SE. of the town. The light is 24 feet above the level of the sea, and is visible five miles.

**Bol.**—This village is about midway on the S. coast, and is the center of the trade of the whole island, being rich and populous, and extending about two-thirds of a mile along the shore. Near the center of it is a cove, in which small craft find shelter. Vessels anchor outside opposite the cove, in from nine to 11 fathoms, sand, abreast of St. Nicolo church, which stands on a hill at the E. extreme of the village. In approaching the anchorage from the westward, a good berth should be given to Lunga point, about a mile W. of the village, and a reef which extends some distance from it.

Water and small supplies of provisions may be obtained.

**LIGHT.**—A *fixed red* dioptric light, is exhibited from an iron stand-ard on the extremity of the new parapet of the great dike at port Bol, *Greco di Lesina* channel.

The light is elevated 16 feet above high water, and 14½ feet above ground. It is visible, in clear weather, from a distance of three miles.

**Mount St. Vito**, 2,570 feet above the sea, the highest point of the island, is a good distant mark for the anchorage, Bol lying at its foot about two miles eastward of its summit.

**Ports Giuseppe, Lucice, Gerska, and Oliveto**, near the western extreme, are the only other anchorages worthy of mention on the S. coast of Brazza, and these are available to small craft alone, which frequently await in one of the first two, a favorable opportunity for passing through Spalato passage. In these little ports vessels generally secure to the shore after anchoring.

**BRAZZA CHANNEL**, a continuation of Spalato channel formed between Brazza island and the coast of the mainland, is exposed to sudden violent bora gales. The current is regular, but frequently rapid when the Narenta and Cetina rivers are swollen. Near mid-channel the bottom is almost everywhere mud; along the shore of Brazza, and occasionally near the mainland, it is a mixture of mud and sand.

Two rocky shoals lie in the channel; the five-fathom patches between Stobrez village and Spalato, and the three-fathom shoal off port St.

Pietro, Brazza island. Coasting vessels keep close to the Dalmatian shore, and do not navigate the channel at night.

**The COAST** of the mainland between Makarska and the mouths of Narenta river is backed by high land, presenting a few bare peaks; mount Snavid (3,820 feet), which lies nearly N. of the E. extreme of Lesina island, is the highest and most remarkable of these peaks, and is of conical form. A few scattered villages may be seen within the coast, and the land appears fertile and well cultivated.

There is no port or good anchorage on this part of the coast, an extent of about 23 miles. Small craft occasionally anchor under it for shelter from a bora gale in about nine fathoms, at about 200 yards from the shore, and when meeting contrary winds between the E. extreme of Lesina island and the mainland, resort to Durvenik cove and Zaostrog bay, which lie northeastward of the former. The cove may be known by a small chapel on the starboard point of the entrance, and by some houses at the head of it; the holding ground, mud, is good. The anchorage is marked by a convent on its N. shore. The small vessels frequenting these little bays anchor in the middle of them, and, to obtain extra security seaward against southerly winds, lay out a cable to the shore.

**NARENTA CHANNEL** is formed between the E. extreme of Lesina island and the coast of Dalmatia on the one side, and Sabbioncello peninsula on the other, and is clear with deep water. It is advisable, when proceeding up this channel, especially with northerly and easterly winds, to keep near the shores of Lesina and the mainland, where a favorable counter current will generally be met, as the Sabbioncello coast is iron-bound, and without places of shelter. The waters of the Narenta flow into the eastern part of the channel and cause a rapid westerly current, especially in the rainy season, at which period the water is frequently discolored as far as the entrance of the channel.

**Gradac.**—About 19 miles SE. from Port Makarska is the town of Gradac, situated on a point which makes out between Gradac cove and Gradac bay, two small indentations of the main coast which offer shelter for small craft.

**LIGHT.**—A *fixed* white dioptric light, is exhibited from an iron standard on a stone column at the head of Gradac dike. It is elevated 14 feet above high-water, 13 feet above the ground, and is visible, in clear weather, from a distance of three miles.

**Port Tolero.**—The W. side of the entrance to this little port is the high bluff point of Visnica, the termination of the bold coast on the N.; the

E. side of entrance is the low broken shore forming part of the delta of the Narenta, the shoal water from which, reaching almost over to the high land of Visnica, leaves only a narrow passage into the port. The passage is about 1,200 yards in length, eastward of a large rock a little within the entrance, and then close along by the W. shore, the least water being two fathoms. Within is a land-locked basin nearly three-quarters of a mile N. and S. and a third of a mile wide, with six and seven fathoms water, and protected from the S. by the delta of the Narenta.

**LIGHT.**—From point Bat, the first point to the northward of point Visnica, is exhibited a *fixed* white light with two *red* sectors from an iron standard painted green, it is dioptric, elevated 27 feet above high-water, and visible three miles. The *red* sector visible to the N. of the light is comprised between the bearings S.  $13^{\circ} 35'$  W. and S.  $29^{\circ} 35'$  W.; the *red* sector visible to the S. is included between the bearings N.  $27^{\circ} 05'$  E. and N.  $7^{\circ} 05'$  E. Outside of these sectors, toward the mouth of the Narenta river, the light appears white.

**Narenta River**, one of the largest of Dalmatia, rises at the base of the mountains between Bosnia and Herzegovina, and after receiving the waters of numerous tributaries enters Dalmatia at Metkovic village. Thence, in its course, it is joined by the Norina river, and at Opus branches off, and traversing a marshy country in numerous small streams, reaches the sea S. of Visnica point, at the little port of Tolero.

The streams by which it discharges into the sea occupy an extent of coast of about three miles, of which the greater part on the N. is a sandy beach steep-to, between two wooded elevations. Two of the streams are navigable, having a depth of two to nearly three fathoms, but the bars, on which there are but a few feet of water, render them inaccessible from the sea, except by boats or vessels of the lightest draught.

Boats drawing not more than  $4\frac{1}{2}$  feet, proceed by the westernmost of the two navigable streams as far as a village, the first one reached after leaving Dalmatia; boats of a greater draught ascend to Norina tower; and thence by the river of this name to Vido, a little village close to the ruins of the ancient *Narenta*. Narenta valley is nearly uninhabited, owing to malaria arising from the extensive marshes; eels are in great abundance here.

The town of Narenta was formerly the capital of Dalmatia, and of great influence, exacting tribute from the whole of Dalmatia and from Venice for the right to enter the channel. It was afterwards governed by independent sovereigns and formed a separate duchy.

**Narenta Anchorage.**—At about three miles to the SE. of Visnica point is the islet of Ossin, the intermediate space being the delta of Na-

renta. At the N. end of Ossin islet, the low sandy shore falls back and forms a bay, where there is anchorage in 10 fathoms water, mud bottom. On the SE. side of Ossin islet is a small sheltered area with three and four fathoms water, called Blaca bay.

The coast between the mouths of the Narenta and the entrance to Klek bay, a distance of about  $5\frac{1}{2}$  miles, is steep and rocky, backed by high mountainous land, and presents nothing more remarkable than a church and dwellings here and there. There are two little bays between, and anchorage all along at a half or three-quarters of a mile from the shore.

**Klek Bay** is an inlet  $3\frac{1}{2}$  miles in length, and about a half a mile in breadth, formed by a high narrow peninsula which follows the direction of the coast northwestward. The entrance is open to the SW., about 800 yards in breadth, the S. point is bordered by shoal water, the N. point is steep; within the entrance, a rock above water lies on the N., and another on the S.; but there are no hidden dangers in the bay, which has a depth of 10 to 14 fathoms, and it would be an excellent port for vessels of the greatest draught were it not so inconveniently isolated.

There is no water, and the shores, which are well wooded, are nearly uninhabited; the nearest watering place is Briesta, opposite in Sabbioncello.

**LIGHT.**—A *fixed red* light is exhibited from a small masonry tower situated 11 yards from the S. edge of Montecuccoli rock. The light is elevated 26 feet above high water and is visible three miles. The tower and the keeper's dwelling attached are painted white.

**Stagno Picolo Channel** is the continuation of Narenta channel, and commences at the entrance to Klek bay. The channel is deep and clear, with muddy bottom; there are no hidden dangers, and vessels of large draught may anchor safely in any part; but the narrowness of the channel and the frequency of violent bora gales render its navigation difficult. Stagno Picolo town, almost in ruins, is near the SE. extreme; it is visited by vessels under 12 feet draught, as a rocky bank, with about that depth, bars the passage.

The shores of this channel are high and wooded, and the sinuosities are filled up with trunks of trees, from which the natives gather great quantities of oysters.

**CAPE GOMENA**, the NW. extreme of Sabbioncello peninsula, is lower and less steep than the rest of the coast, but the land  $3\frac{1}{2}$  miles within it rises 1,107 feet, and three miles farther W. to 2,519 feet above the sea. The N. side of the cape is bordered by a rocky bank which extends off more than a quarter of a mile.

Thence eastward the whole northern shore of Sabbioncello peninsula, forming the S. side of Narenta channel, is high, wooded, and with two exceptions, steep-to, and affords no shelter. Duba point, on which there is a chapel, is bordered by a shoal; and beyond, about a half a mile W. of Trappano, is another shoal with two fathoms water on it, about a quarter of a mile from the shore, with 12 fathoms inside it. There are a few villages to be seen, the chief of which, Trappano and Duba, are easily recognized by their church steeples; the inhabitants carry on a small trade in cured fish.

**LIGHT.**—A *fixed* white light on cape Gomena is shown from a small masonry tower of reddish color, 27 feet in height, which stands 20 feet from the extreme point of the cape.

The light is 34 feet above the level of the sea and should be visible from a distance of 11 miles. It illuminates an arc of  $261^{\circ}$  between the bearings N.  $78^{\circ}$  E. and S.  $3^{\circ}$  E.

**Briesta Bay.**—Opposite the entrance to Klek bay is an indentation  $3\frac{1}{2}$  miles in length, and about a mile deep, encumbered with islets, rocks, and shoals. The little islet of Goliak lies nearly two-thirds of a mile off its NW. extreme, and a smaller islet between it and the shore. The SE. point projects to the NW., covering an anchorage sheltered from the eastward, in 10 to 12 fathoms water, and in the extreme corner thus formed is the village and church of Briesta.

**LESINA**, the ancient *Pharos*, is one of the largest and most populous of the islands of Dalmatia, from which coast, its eastern end is distant a little over two miles. The island is 37 miles in length in an E. and W. direction; its breadth for 22 miles from the E. end averages about two miles, when the island widens to five miles by the N. coast turning northward, which is much broken and irregular as far as the W. end. Nearly the whole of the S. side rises abruptly, a chain of mountains at a short distance from the sea extending from the W. end along more than two-thirds of its length. The highest of these, about 11 miles from the western end, is mount St. Nicolo (2,079 feet), which has a chapel on its summit.

From mount St. Giorgio, 1,165 feet high, and 11 miles from the E. end, the heights decline gradually in that direction to the extreme. The elevated portions of the island present the bare appearance common in these parts; the lands sloping towards the N. are well cultivated and abound in wood and pasture grounds.

There are numerous villages besides Lesina town, and in all about 17,000 inhabitants, who are considered good sailors and expert fishermen, and carry on a considerable trade in salt fish and sardines, which are plentiful on the coast. These, and wine of good quality, oil, wheat,

honey, a great deal of which latter is exported, and firewood form the chief products. The island affords various good anchorages in bora gales.

A telegraphic cable runs from Chiave, the bay next W. of Oskoracia cove on the N., to Bol, in Brazza island, and from Ulenebocke bay at the W. end of Lesina, passing between Borovaz and Vodnjak islets to Smocova cove, at the NE. end of Lissa. The E. end of Lesina (Turicina bay, not on chart) has communication by a cable with Igrane, on the coast northward of it. Also, Smerska cove on the S. coast, with cape Gomena, Sabbioncello.

**GRECO de LESINA CHANNEL** is the passage between Lesina and Brazza islands, and has a varying breadth of from about two to  $6\frac{1}{2}$  miles. There are no hidden dangers, except the shoal projecting from Lunga point of Brazza island; the depth in the middle of the channel is from 40 to 44 fathoms, and the bottom is sand, sand and mud, or mud.

This channel is seldom used, excepting by vessels bound to Makarska, on the mainland. The shore of Brazza should be kept aboard, so as to be enabled to bear-up for Citta Vecchia bay, or for Lesina channel, if overtaken by a bora, and shelter from this wind may also be obtained in the channel under Brazza, off Bol village.

**The Current**, which generally sets to the westward, is influenced at the most contracted part of the channel by northwesterly and by southeasterly winds; also by the waters of the Narenta.

**CAPE PELLEGRINO**, the W. extreme of Lesina, is the termination of the mount of the same name, which is three-quarters of a mile inside the cape, and 508 feet high. From the cape, which is steep-to, the N. coast trends eastward 10 miles to the town of Citta Vecchia; it is all along bold, broken, and cut up into numerous little coves, the land immediately over it rising 1,130 feet above the sea.

**Citta Vecchia Bay** is formed between the eastern part of the land just described and a fertile peninsula with an irregular and bold coast, projecting from the N. side of the island, and terminating seven miles from its W. extreme in Kabal point, which is well wooded and 444 feet high. The bay is four miles deep, and averages about a mile in breadth, open to the NW., but well sheltered from northerly winds by a deep indentation on the N. shore. The bottom is mud and sand. The town of Citta Vecchia, at the head of the bay, is the most populous on the island, and carries on a great part of the maritime commerce of Lesina. Coasting vessels are built here. Water and provisions may be obtained.

The best anchorage for small vessels is in port Tiha, the first or outer indentation on the N. side of the bay; vessels of larger size anchor at the entrance in 14 to 21 fathoms. The water is shoal around the middle

point on the NW. side of the port. Coasters moor in the inlet a little below the town.

**LIGHT.**—A *fixed green* dioptric light is shown from a small stone tower on Fortino point, at Citta Vecchia. It is elevated 23 feet above the level of the sea and visible five miles.

**Ports Verboska and Gelsa.**—Immediately eastward of Kabal point, the N. extreme of Citta Vecchia bay, is an indentation three-quarters of a mile deep called port Vlaska, the E. point of which is foul; the coast is then irregular and broken for eight miles beyond to port Verboska, which is protected from northerly winds by a strip of land 105 feet high, on the N. side projecting eastward, the extremity of which is Glavica point. Vessels anchor in about 12 fathoms, mud, a short half a mile westward of Glavica point, within the bend of the shore. Small vessels proceed farther in, and secure from bora gales by laying out cables to the shore northeastward. At the head of the narrow inlet, which runs in about a mile from Glavica point, is the village of Verboska.

On the N. side of Glavica point is the islet of Zecevo, 117 feet high; the S. point of the port is bluff, precipitous, and covered with trees.

Port Gelsa is an inlet about 800 yards deep, open to the NE., the entrance being a long half mile S. of Glavica point. In the interior of the port is the village of the same name, and here the inlet turns to the W., and is protected by two moles, one projecting from the N., and the other from the S., within which there are  $3\frac{1}{2}$  and two fathoms water. Small vessels also anchor in about six fathoms water, in the middle of the inlet. Water may be obtained in abundance at this little village.

**LIGHT.**—On the N. mole head at Gelsa is a small octagonal white tower, which exhibits at 21 feet above the sea a *fixed* white light, visible nine miles. During a bora it is not possible to exhibit the light.

**Coast.**—From port Gelsa the shore runs nearly straight about 22 miles to the E. extreme of the island. There is no port or place of shelter in all this distance, with the exception of little coves here and there, and the water is all along deep; there is, however, a shoal, with  $4\frac{1}{2}$  fathoms water, lying about two-thirds of a mile off the W. point of Pogarila vela cove,  $7\frac{3}{4}$  miles westward of St. Giorgio point, which should be avoided.

**ST. GIORGIO POINT,** the E. extreme of Lesina, is low, with a chapel on it; it is steep-to on its N. and E. sides, but there are two fathoms water near its S. side.

**LIGHT.**—A *fixed* white light is exhibited from an iron standard on a stone column at the head of the dike of San Giorgio di Lesina. It is elevated 14 feet above high water and 13 feet above the ground, and



is visible, in clear weather, from a distance of three miles, over an arc of  $300^{\circ}$ , that is, from S.  $59^{\circ}$  E. to N.  $59^{\circ}$  E.

**Anchorage.**—Port St. Giorgio, about two-thirds of a mile from St. Giorgio point, is formed by a small mole, which affords shelter to coasting vessels; near it, on the beach, is a tower. This is the principal, and may be said to be the only anchorage eastward on the S. side of Lesina; but vessels of any draught may take temporary shelter from a bora gale under any part of the shore from port Martinisko, which is about four miles from St. Giorgio point, to abreast of cape Gomena, the W. extreme of Sabbioncello peninsula. The anchor should not be dropped in a greater depth than 18 fathoms, weeds, nor at much more than 400 yards from the shore.

**PORT LESINA.**—This is the only port of any consequence on the S. side of the island, it is about  $3\frac{1}{2}$  miles from Pellegrino point. It is open to the southward, but somewhat sheltered from this quarter by the small islet of Krisnirad, which is 33 feet high, and has a battery on it. The anchorage is in 19 or 20 fathoms, southwestward of Veneranda battery, with Krisnirad islet SE. by E.  $\frac{1}{4}$  E. about 450 yards. Vessels of light draught anchor in the port off the town. The port is much frequented, being in the route to Planka point, and to the various channels, and it is not unusual to see a great number of vessels here when the weather is threatening.

The citadel, on a hill of marble, points out the position of the port from all quarters; the town of Lesina, which is bordered by quays, is extremely well built, and is defended by several forts and batteries.

**Supplies.**—Water and provisions may be obtained; also timber for the repair of vessels.

**The Spalmadori Islands.**—These islands and rocks lie immediately westward of port Lesina, and extend over a space of six miles in at E. and W. direction, and  $1\frac{1}{2}$  miles N. and S.; they range from about 100 feet at the E. end to 335 feet above the sea, near the W. end of Clemente, the largest of the group; the coast line of the whole being irregular and deeply indented with bays and coves from end to end. The S. sides of the group are precipitous and of barren aspect, and should not be approached too near, especially in bad weather, on account of the outlying dangers and the rapidity of the current through the narrow passages. The islands are covered with trees and brushwood, and on the N. side of Clemente may be seen a few dwellings.

**Vodnjak Islet**, the western of the group, is about 900 yards in extent, 172 feet high, with several smaller islets or rocks and shoal water around its N. side. At a quarter of a mile SW. by W.  $\frac{1}{4}$  W. nearly, of Klobuk, the western islet or rock (33 feet high), and the same distance

from the nearest part of Vodnjak, is a shoal with  $2\frac{1}{2}$  fathoms water on it. This is the western danger of the Spalmadori group, and should be avoided when rounding this end of the islands.

**Port St. Clemente.**—On the S. side, and nearly midway along Clemente island, is the islet of Dobriotok, fronting a bay called port St. Clemente. The islet is 189 feet high, 200 yards from the S. horn of the bay, and connected to it by a bank with four fathoms water on it. The bay is half a mile in length NW. and SE., and nearly a quarter of a mile in breadth, open to the westward, and affords shelter from all but westerly winds, in about 18 fathoms water. In approaching port St. Clemente from the westward, Rasanj point, the SW. extreme of the island, should be given a wide berth, as shoal water extends along 200 yards southward of it.

**Stambedar Islet**, the southernmost of the Spalmadori islands, is 169 feet high, and lies 1,400 yards to the SE. of Dobriotok islet, and a short half mile from the nearest point of Clemente island. The S. side of this islet is steep-to, but the Planchetta islets close to the eastward are surrounded by shallow water; and a rocky shoal, with  $2\frac{1}{2}$  fathoms water on it, lies 450 yards eastward of Planchetta. A vessel from the eastward seeking shelter in port St. Clemente should avoid these dangers, but may pass close to the S. side of Stambedar.

**Girolamo Islet**, the eastern of the group—if we except Pokonjidol—is nearly 600 yards in diameter, and about 100 feet high, with a shoal extending more than 200 yards from its N. point. At rather more than a quarter of a mile off its S. side are two rocky shoals 300 yards apart, with three fathoms water on the western and  $4\frac{1}{2}$  fathoms on the eastern shoal; there are 20 fathoms between the two shoals, and five to 15 fathoms between the shoals and the islet.

At rather more than 300 yards off the E. side of the islet is another rocky shoal with four fathoms on it, and from  $5\frac{1}{2}$  to 17 fathoms between it and the islet.

The church of San Marco, on the left, at the head of port Lesina, about midway between Krisnirad islet and the shore E. of it, bearing about N.  $\frac{1}{4}$  W., leads eastward of the southern dangers, and between Girolamo and the shoal E. of it.

**LIGHT.**—Pokonjidol islet is about 200 yards in diameter, 65 feet high, surrounded by a narrow bank, and lies 1,200 yards eastward of Girolamo islet, and 300 yards from the shore of Lesina. On the islet is a light-house rising from the keeper's dwelling, which exhibits at 67 feet above the sea a *fixed red* light, visible from a distance of nine miles.

**Port St. Pietro**, about  $5\frac{1}{2}$  miles from the western extreme, is the chief of the small ports or coves on the N. coast of Brazza, and is protected by a mole. Its position is denoted by a small church on the W. point of the port, and by the village, which is on an eminence. At half a mile off the shore and fronting the port there is a patch with three fathoms water.

**LIGHT.**—On the mole head at port St. Pietro, is a small stone turret, 21 feet high, which exhibits a *fixed green* light, visible from a distance of five miles.

**Postire.**—Three miles to the eastward of port St. Pietro, is the town of Postire, situated on a small bay, which is partially protected from seaward by a dike.

A *fixed* white light, elevated 15 feet above high water, and visible from a distance of five miles, is shown from a wooden post, placed on the extremity of the dike, at Postire.

**Port Pucisce**,  $8\frac{1}{2}$  miles eastward of St. Pietro, is a narrow inlet about two-thirds of a mile deep, with 17 fathoms water at the entrance, to three fathoms in to the village at its head.

**LIGHT.**—A *fixed red* dioptric light is exhibited from the tower of the church of San Nicolo, on San Nicolo point, to the westward of the entrance to Port Pucisce, Brazza island.

The light is elevated 45 feet above high water, and 29 feet above the ground, and is visible three miles.

**Luka Cove**, four miles farther on, and the same distance from the E. extreme of the island, is an inlet running more than a mile to the westward somewhat in the direction of the island, with eight and nine fathoms water near its head; being open to eastward it is exposed to winds from that quarter.

At the entrance, Povie cove with from nine to 12 fathoms, but not so deep as Luka, extends SE. to the village of the same name. In this latter cove there is anchorage for small vessels, which is sheltered from the eastward.

There are other small coves along the N. coast of Brazza, frequented by boats which carry on trade with the mainland.

**LIGHT.**—On point San Antonio, the eastern point at the port of Povie, is exhibited from a white masonry tower at an elevation of 23 feet above high water, a *fixed* white dioptric light, visible five miles. Vessels entering or leaving the port should pass the point on which the light is situated at a distance of about 200 yards.

**Port St. Martino**, at the SE. end of Brazza, affords protection for small vessels from the bora, in about seven fathoms mud, on the W. side of a headland which forms the port. Vessels of light draught

anchor farther in. The woods on this part of the island are considered to break, to a great degree, the force of the bora.

St. Rocco point, upon which is a church, is two miles southward of cape Planche the E. extreme of the island, and about half a mile NE. of the entrance to the port, and sufficiently indicates its position.

**LIGHT.**—At San Martino the light is *fixed* white, dioptric, and is shown from a small stone tower on the SE. side of the keeper's dwelling, on the point SE. of the town. The light is 24 feet above the level of the sea, and is visible five miles.

**Bol.**—This village is about midway on the S. coast, and is the center of the trade of the whole island, being rich and populous, and extending about two-thirds of a mile along the shore. Near the center of it is a cove, in which small craft find shelter. Vessels anchor outside opposite the cove, in from nine to 11 fathoms, sand, abreast of St. Nicolo church, which stands on a hill at the E. extreme of the village. In approaching the anchorage from the westward, a good berth should be given to Lunga point, about a mile W. of the village, and a reef which extends some distance from it.

Water and small supplies of provisions may be obtained.

**LIGHT.**—A *fixed red* dioptric light, is exhibited from an iron stand-ard on the extremity of the new parapet of the great dike at port Bol, *Greco di Lesina* channel.

The light is elevated 16 feet above high water, and 14½ feet above ground. It is visible, in clear weather, from a distance of three miles.

**Mount St. Vito**, 2,570 feet above the sea, the highest point of the island, is a good distant mark for the anchorage, Bol lying at its foot about two miles eastward of its summit.

**Ports Giuseppe, Lucice, Gerska, and Oliveto**, near the western extreme, are the only other anchorages worthy of mention on the S. coast of Brazza, and these are available to small craft alone, which frequently await in one of the first two, a favorable opportunity for passing through Spalato passage. In these little ports vessels generally secure to the shore after anchoring.

**BRAZZA CHANNEL**, a continuation of Spalato channel formed between Brazza island and the coast of the mainland, is exposed to sudden violent bora gales. The current is regular, but frequently rapid when the Narenta and Cetina rivers are swollen. Near mid-channel the bottom is almost everywhere mud; along the shore of Brazza, and occasionally near the mainland, it is a mixture of mud and sand.

Two rocky shoals lie in the channel; the five-fathom patches between Stobrez village and Spalato, and the three-fathom shoal off port St.

which are several towers. The shores are high and of bold approach, excepting in the immediate vicinity of the SE. shore.

There are about 6,000 inhabitants, who chiefly occupy the two principal towns, Lissa at the NE. and Comisa at the W. end of the island; many of them are sailors and fishermen. Lissa has a good harbor. Oil, wine, honey, and wheat in small quantities form the main produce, and considerable exports of sardines and of salt-fish take place. The British had possession of this island from 1812 to 1815.

A telegraphic cable runs from Smocova cove, at the NE. end of the island, to Ulenebocke bay, in Lesina, passing between Vodnjak and Borovaz islets, Spalmadori islands.

**North Coast.**—Between port St. Giorgio and Stončica point, the NE. extreme of Lissa,  $2\frac{1}{4}$  miles eastward of Hoste island, the coast is bold, steep-to, and forms two or three coves, the one next W. of the point being two-thirds of a mile deep. Stončica point slopes gradually seaward, and has a conspicuous white light-house on it, about 50 yards from the sea. The coast from port St. Giorgio to the NW. point of Lissa, a distance of seven miles, is bold and steep-to, with one or two little coves, and a small islet or rock close to the shore about midway; it is backed by elevated land, which near the W. end, and  $1\frac{1}{4}$  miles from the N. coast, is 1,663 feet high.

**LIGHT.**—The light-house on Stončica point exhibits, at 125 feet above the sea, a *fixed* white light varied by a *flash* every *minute*, and visible in clear weather from a distance of 17 miles. The light is seen when bearing from ESE. through S. and W. to N.  $\frac{3}{4}$  W.; this latter bearing cuts inside Greben islet and the shoals off the E. coast of Lissa.

**Signal Station.**—At about 80 yards SW. of the light-house is a building, painted with black and white stripes, having on it a black mast with a gaff or yard. The signals used are those of the International code, and the station is connected with the telegraph net of the continent.

A vessel wishing to forward a telegram to the station should hoist her national colors with the distinctive pendant of the code under, and then make the signal showing the name of the ship, &c. Written messages are also received and transmitted by the telegraphic wire. Telegrams are to be paid for by the sender, if addressed to a ship; or by the receiver if coming from a ship.

The forecast of the weather, communicated to the station by the meteorological department, will be signaled *gratis* to vessels under way applying for the same. In the event of an expected gale, the corresponding signal will be hoisted.

**Port St. Giorgio**, on the NE. side of Lissa, is surrounded by hills;

it is a mile deep, about 650 yards wide at the entrance, between Hoste island and the shore SE. of it, 800 yards half way in, and 1,200 yards at the head of the port, with from 25 fathoms water in the outer part to 10 fathoms close in, having thus sufficient space and depth for vessels of large size.

Vessels of large draught anchor in about 20 fathoms, sand and gravel, a little inside the battery on the E. side of entrance, and at an equal distance from the two shores; or farther in abreast of the projection on the western shore, upon which is a chapel and the arsenal, in a depth of about 14 fathoms, muddy bottom. Vessels of light draught moor in the SW. angle of the port, close to the town of Lissa.

It is sheltered in every direction except from the northeastward, and Hoste island, at the entrance, breaks the sea considerably, though during a bora gale much sea sets in, but the holding ground is good. Moor with the starboard anchor to the SE., and the port anchor to the NW., so as to have an open hawse to the NE.; but there are three pair of moorings in the port, which are generally placed at the disposal of foreign vessels of war calling here. A southerly gale at times comes on with little warning.

**Supplies.**—Water is very scarce, and in the summer season is conveyed from Comisa. Provisions may be obtained; also the means of repairing vessels.

**LIGHT.**—The light-house on the NE. end of Hoste island exhibits, at 70 feet above the sea, a *fixed red* light, visible nine miles.

**Vitelli and Vacca Rocks.**—The northeastern and larger of two rocks lies about NW.  $\frac{3}{4}$  N., three-quarters of a mile from the light-house on Hoste island, and a reef extends nearly 100 yards southward of it. At 250 yards to the SW. of the above is the smaller of the two rocks, with 10 and 13 fathoms water between them. A sunken danger, with  $3\frac{1}{2}$  fathoms on it, lies about 100 yards S. of the smaller rock; between this danger and the nearest point of land is a clear channel, a quarter of a mile wide, with from  $6\frac{1}{2}$  to 15 fathoms.

Vacca is a large rock, nine feet above the sea, lying a quarter of a mile from the coast on the E. side of entrance to port St. Giorgio, and about E.  $\frac{1}{2}$  N. 1,200 yards from Hoste light-house; it is bordered by shoal water, except the NW. side. The above rocks are whitewashed to render them more conspicuous.

**Hoste Island** is 400 yards in length, 103 feet high, bordered at each end by a bank, with a white light-house on its NE. end; it is separated from the W. point of entrance to port St. Giorgio by a passage 200 yards wide, with  $6\frac{1}{2}$  fathoms water, midway. This island breaks the sea when setting into port.

The above rocks and island, excepting in obscure weather, when they are not conspicuous, present no difficulties whatever; but it is advisable not to pass close to them without a commanding breeze, as the current generally sets towards them.

**Directions.**—On arriving at port St. Giorgio, a chapel will be seen on an eminence at the head of the port; the fortifications on the hills near the entrance, the highest of which is on the port hand; and on a near approach Hoste island light-house and the outlying rocks will be distinguished, and then the white houses of Lissa.

When the weather is not clear, by keeping the higher of two towers on the starboard hand in range with the chapel on mount Hum, leads towards the shore between Vacca and the Vitelli rocks.

The entrance to port St. Giorgio is difficult in a sailing vessel with southeasterly winds, as heavy squalls often render it impossible to carry sufficient sail. When making for this port from the eastward, it is advisable to keep at a distance from the high lands, to avoid the strong sudden gusts which descend from them.

**Port Carober.**—This little port, close to the westward of port St. Giorgio, is convenient for small craft when unable to reach the latter; the anchorage is at about one-third from the entrance towards the head of the bay, and off a cove on the S. side. Between this cove and the entrance the bottom is rocky, and easterly winds are felt in full force.

**COMISA BAY.**—This bay, at the W. end of Lissa, occupies an area of about  $1\frac{1}{2}$  miles N. and S., and a long mile eastward; it is sheltered from all winds from the eastern quarter by the high land around it, and is consequently a place of refuge from the bora and SE. winds, but westerly and southwesterly winds send in a heavy sea, though it is in some degree protected from the latter quarter by Busi island.

The village is in the NE. corner of the bay, and the anchorage is off it, but the water is deep, and a vessel must go pretty close in; the bottom is mud. Coasters moor in the cove, protected by a mole. There is also anchorage half a mile southward of the mole, but farther on in the same direction the bottom is rocky.

**Water** may be obtained near the village from the fountain, which occasionally supplies the inhabitants of Lissa.

**LIGHT.**—A small *red* light, visible five miles, is shown from the mole at the village of Comisa.

**Directions.**—Mount Hum, near the SW. extreme of Lissa, and Busi island, off its SW. point, and forming the S. extreme of Comisa bay, are good marks for this anchorage. Two small islets or rocks lie close to the NW. point of Lissa, and may be rounded at a prudent distance. In a NW.  $\frac{1}{4}$  W. direction from the inner or larger rock, distant  $1\frac{1}{2}$  miles

nearly, is a small bank with  $5\frac{1}{2}$  fathoms water, and between it and the rock, and about three-quarters of a mile from the latter, is another patch with five fathoms. The two points of the bay are of bold approach; the southermost, which slopes gradually seaward, is covered with pine trees, and near the shore on its W. side, and 400 yards from the point, is a sunken reef. Working up under the land, a vessel should be prepared for heavy squalls.

Comisa bay and port St. Goirgio, being in the route of vessels traversing the Adriatic, and to the westward of all the channels between the islands off this part of the coast of Dalmatia, are very important to the navigation of this sea.

**Port Manego.**—The coast between Stupiski, the SW. point of Lissa, and Ravnik islet, at the SE. point, is rocky and inaccessible. Temporary shelter from the bora may be sought under it, but the anchor must be dropped very close to the shore. Ravnik islet is 157 feet high, and about half a mile in length, and between it and the shore of Lissa is the small anchorage called port Manego, which has a depth of 12 fathoms. It is exposed to northerly and southerly winds, and those from the southeastward send in a heavy sea, but the holding ground is good. The best berth is northwestward of the center of the islet, and the best passage to it is from the southwestward, between the islet and Lissa.

**The Coast**, between Ravnik islet and the NE. end of Lissa, is bordered by a chain of islets, rocks and shoals to the distance of about a mile, and should be avoided, unless with local aid.

A rocky shoal, with  $5\frac{1}{2}$  fathoms water on it, lies with the center of Ravnik islet bearing W.  $\frac{1}{4}$  S., and Stončica point light-house NW.  $\frac{3}{4}$  W. distant  $5\frac{1}{4}$  miles.

**Busi Island** rises abruptly about  $2\frac{1}{4}$  miles southwestward of Lissa; it is  $2\frac{1}{4}$  miles in length N. and S., about a mile in breadth, hilly, and the most elevated part, which is to the southward, is 627 feet above the sea, with ruins of a castle on it. The shores are slightly irregular, the W. side is straight, and the water everywhere deep; a sunken rock lies close to the NE. point, and though a rock above water close to the shore, it is readily distinguished; there are no outlying dangers. The island is inhabited.

**The Channel** between Busi and Lissa islands is deep and clear of danger, but Stupiski point should be avoided, as the westerly current sweeps suddenly round it, and a sailing vessel might in light winds be set towards the coast of Lissa.

**St. Andrea Islet**, about 12 miles westward from Lissa, has no bay or inlets affording refuge, and the numerous fishermen's boats which frequent it, are obliged to seek shelter under its lee according to the vary-



ing winds. This islet is two miles in length in an E. and W. direction, about three-quarters of a mile in breadth, and 1,020 feet high, covered with wood, and with the ruins of a castle on it. A sunken rock lies close to its SW. point, but elsewhere the water is deep all round it.

Nearly half a mile westward of St. Andrea is Kamik islet or rock, which has deep water around it; midway between the two the water is deep, but the passage should not be unnecessarily taken, as the current through it is irregular.

At  $1\frac{1}{2}$  miles from St. Andrea islet, and SE.  $\frac{1}{4}$  S. from its NE. extreme is Brusnik islet or rock, 37 feet high, with two small rocks above water, on its SE. side, close to. The soundings midway between Brusnik and St. Andrea are 59 fathoms.

The currents in the vicinity of St. Andrea and its islets are irregular, and cause strong eddies, especially in winter, and the depth is too great for anchoring. The islets should, therefore, be avoided, especially in sailing vessels with light winds.

**POMO ISLET**, which is WNW.  $\frac{1}{2}$  W. nearly, from the summit of St. Andrea, and about  $12\frac{1}{2}$  miles from the nearest part of that islet, being in the center of the Adriatic, is an excellent point of departure for vessels bound from the Italian coast to the vicinity of Planka point, or to the channels leading to Zara and Spalato; also for those navigating this sea at a distance from its western shore. It is a barren, inaccessible rock, 314 feet above the water, of reddish hue, and at a distance, at times, resembles a vessel under sail. The soundings in the immediate vicinity of Pomo islet are from 31 to 48 fathoms, and a mile southward 56 fathoms.

**Danger.**—At  $1\frac{1}{2}$  miles NW. by W.  $\frac{1}{2}$  W. from Pomo islet is a rocky shoal with  $3\frac{1}{2}$  fathoms water on it. The soundings around this danger are from 20 to 35 fathoms, and three quarters of a mile southward of it 100 fathoms.

## CHAPTER XI.

### COAST OF DALMATIA FROM CAPE GOMENA TO CATTARO, AND ADJACENT ISLANDS.

VARIATION in 1883.

Cape Gomena,  $8^{\circ} 54'$  W.

Curzola island, west end,  $9^{\circ} 14'$  W.

Meleda, east end,  $8^{\circ} 44'$  W.

Point d'Ostro,  $8^{\circ} 24'$  W.

Between cape Gomena, the NW. extreme of the peninsular of Sabbioncello, and the entrance of the gulf of Cattaro, is a distance of nearly 80 miles. The shore is backed at a short distance by mountainous land, with but little intervening space of cultivated ground. Oil, and wine which is considered the best in Dalmatia, are the chief products. The occupation of the inhabitants, generally, is maritime commerce.

**Curzola, Meleda, and Lagosta** are the three principal adjacent islands; the others are thinly peopled or uninhabited. The bays formed by them contain abundance of fish, especially sardines and mackerel, but being destitute of fresh water they are seldom visited.

**SABBIONCELLO PENINSULA.**—This singular peninsula which leaves the coast of Dalmatia at a small angle in a northwesterly direction, is 36 miles in length, with an average of three miles in breadth. Mount Vipera, its greatest elevation, rises in a conspicuous hummock  $7\frac{1}{2}$  miles from cape Gomena, its western extreme, and reaches 3,170 feet above the sea; it may be considered the commencement of two chains of mountains, the base of the northern forming the S. side of Narenta and Stagno Picolo channels; while the base of the southern range is washed by the water of Sabbioncello and Meleda channels. Uniting, with a sudden depression near the middle of the peninsula, they form a valley near Giuliana, which is visible from a great distance seaward, and, owing to the violence of the bora, has a desolate, dry, burnt appearance. Mount Carovic, eastward of the valley, and about  $4\frac{1}{2}$  miles from Giuliana, is 2,096 feet high.

**CURZOLA CHANNEL** includes the space between the N. side of Curzola, the S. sides of Lesina island and W. extreme of Sabbioncello peninsula. Although of considerable breadth, it is seldom visited, as it does not lead to any point of commercial importance on the Dalmatian coast. Coasting vessels ordinarily pass northward of Torcolo,

especially when anticipating contrary winds, so as to be in a position to anchor, if necessary, in porto Grande of that island.

**Planchetta Islet** is about  $4\frac{1}{2}$  miles southeastward of the E. extreme of Torcola, and  $3\frac{3}{8}$  miles from the nearest part of the coast of Curzola. It is about 800 yards in length, narrow, 60 feet high, and bordered by a narrow bank, with a reef extending from either end, the southern of which breaks. When bearing about NW. or SE. it has the appearance of two islets. It should not be approached within a prudent distance.

**Sabbioncello Channel.**—The eastern portion of Curzola channel unites with Sabbioncello channel, which is formed between Sabbioncello peninsula and the N. coast of the E. end of Curzola. It is frequently visited by small vessels trading to the coast of Dalmatia, and it affords good anchorage for vessels of any size all along, and at about half a mile from the coast, in 18 to 24 fathoms, sand. Small supplies may be obtained. In navigating this channel, the chart and the eye must be the guide. There is often a strong westerly current.

**Port Luka** is a bay at the W. end of Sabbioncello peninsula, between cape Gomena and Ossit point; the best sheltered part is in a cove at the NE. angle, where small vessels anchor in six and seven fathoms, and secure to the shore. Shallow water extends a third of a mile from Bila point, on the S. side of entrance to the cove; and a four-fathom rocky shoal lies in the fairway about 800 yards from the shore on the N. side of entrance. Vessels unable in contrary or light winds to stem the westerly current in Sabbioncello channel, find this a convenient temporary anchorage.

**Rosario Road**, in Sabbioncello channel, is about  $4\frac{1}{2}$  miles eastward of Ossit point, on the S. shore of the peninsula, and a most eligible anchorage, as there are none on the N. coast of Curzola. A vessel may anchor in 11 or 12 fathoms, mud, and small craft farther in over weedy bottom, where there are facilities for making fast to the shore. The shore is bordered by a narrow bank.

There is a copious spring of water near the monastery, to which the inhabitants of Curzola have recourse in times of drought.

**Kuciste Road.**—This anchorage is about  $1\frac{1}{2}$  miles from Rosario road, in the eastern part of the bend of the shore and about half a mile eastward of the village chapel; here also are means of securing a vessel to the shore. Beyond Kuciste, at about a mile westward of Orebic or Orebiccio, is a similar anchorage, which is marked by some houses overlooked by a Franciscan monastery on the eastern side.

Vessels may also anchor off Orebiccio village, but shoal water extends too far off to allow them to make fast to the shore, excepting to the

westward of the mole. The inhabitants of Orebiccio are chiefly seafaring men.

**LIGHT.**—A *fixed red* light is shown from the extremity of the mole at Orebiccio, visible five miles.

**Giuliana Bay.**—This bay is  $3\frac{1}{2}$  miles wide, and at each point of entrance is a small islet, the bay falling back about  $1\frac{1}{2}$  miles, with deep water, except a sunken rock about 400 yards from the outer of two islets off Vucine cove, in the SE. part of the bay. This bay, with that on the opposite side of Sabbioncello peninsula, contracts the breadth across to  $1\frac{3}{4}$  miles, which is its narrowest part, and the high land on the N. part of it falling suddenly forms a conspicuous valley.

**Port Terstenik.**—This is a semi-circular bay, about half a mile wide, formed in the NW. part of Giuliana bay, and is opened to the southward. It is resorted to by small vessels in the summer season, the only time of year it can be considered safe; these vessels anchor at the entrance in 16 fathoms, weeds, and lay out cables to the shores, eastward and westward, against the violent gusts of the bora, which descend from Giuliana valley. Here they are partially protected from the eastward by a small peninsular rock, and are sheltered from westerly winds; those from the southward send in a considerable sea. Near a projecting point in the middle of the bay is a small church, to the westward of which is the ordinary anchorage, abreast of some stone houses on the beach.

**COAST.**—Immediately eastward of the village of Orebiccio the shore forms a bay about three-quarters of a mile deep, and then trends south-eastward to Giuliana bay, a distance of about 11 miles. The water is deep all along. The coast from Giuliana bay to the beginning of the peninsula is high and of whitish aspect, with scattered patches of brushwood. With the exception of a shoal with  $1\frac{1}{2}$  fathoms water on it, lying about 350 yards from the shore, and 800 yards SE. of the islet at the S. point of Giuliana bay, the water is everywhere deep and the shore bold. It is almost uninhabited, without any good anchorage, and subject to sudden squalls from ENE., especially towards the close of day; it is therefore advisable to keep as close to the shore as possible.

Small vessels occasionally anchor at port Prapatna, about five miles to the NW. of Olipa islet, where they secure to the shore. There is no village in the immediate neighborhood, but a path leads from this little port to Stagno town,  $1\frac{1}{2}$  miles to the NE. The whole of the coast is backed by high land, the mountains rising immediately over it.

**The NORTH COAST** of Curzola island eastward to about opposite the W. extreme of Sabbioncello peninsula, is sparsely inhabited and covered with trees. The water is everywhere deep, there are no hidden dangers, except a sunken rock close to Prokodistje point about half-

way along it, and there are one or two little islets close to the shore. The country vessels seldom approach it, as with northerly winds it is a dead lee-shore, and there is no anchorage.

**Port Raciste** on the S. side of entrance to Sabbioncello channel, is a small cove open to the northward, with a depth of six to 12 fathoms, mud, in the center; the small vessels which visit the port secure to the shore. The town of Raciste is round the head of the cove.

**Kneza Cove.**—At rather more than  $1\frac{1}{2}$  miles beyond port Raciste is the little islet of Kneza off a point projecting eastward, which together, cover a small cove from W. and northerly winds; small craft anchor in three to five fathoms, muddy bottom. There are two fathoms water between the islet and the point; the islet should not be closely approached, and it forms, with St. Giovanni point on the N., the narrowest part of Sabbioncello channel, which is here only about half a mile wide.

At  $2\frac{3}{4}$  miles eastward of Kneza cove, and 200 yards from the E. point of Verbovica cove, is a shoal with two feet water on it; it is marked by a beacon 15 feet high.

**Curzola Town.**—At about  $3\frac{1}{4}$  miles eastward of Kneza islet is the town of Curzola, standing on a small peninsula point, and defended by a fort in the rear. It is the chief place of export for the produce of the island, and contains about 5,500 inhabitants. A small bay or cove on the W. side of the town affords accommodation for coasters, but they are exposed to N. and westerly winds, and in the bora season there is but little security.

Port Pedocchio, on the E. side and S. of the town, is an inlet about 800 yards deep, with nine fathoms water in the middle, suitable for small vessels, and sheltered from all winds.

At the inner end of the new mole at Curzola is a flag-staff, to which vessels may signal by the international code.

**LIGHTS.**—A *fixed red* light is exhibited from the extremity of the mole at the town of Curzola, visible five miles, which will be seen nearly the whole length of the channel to the westward as well as to the eastward. Also, a small *green* light is shown from the angle of the health office.

**PORT BADIA.**—Fronting the NE. face of the E. end of Curzola island, or between it and the shore of Sabbioncello, is a cluster of islets, rocks and shoals; of these islets Badia, the largest, with Planjak and another islet on the S., form, with the coast of Curzola, a well sheltered anchorage, called port Badia, which, though narrow, is nearly a mile in length, with seven to 12 fathoms water.

A cylindrical beacon, with iron rod and skeleton ball, on a square base of masonry three feet above the sea, and erected in a depth of four feet,

marks the Badia rock; and a similar beacon in a depth of five feet marks the Planjak rock. Also in order to indicate that there is no passage between Badia and Planjak islets, a third beacon is erected between the two former beacons.

In approaching port Badia from the northward, a shoal with two fathoms water on it, lying about 300 yards off the W. point of entrance, should be avoided by keeping on the Badia side. Badia islet is connected to Curzola by a ridge over which  $2\frac{1}{2}$  fathoms water can be carried into the port. Between Badia and Planjak there is only one fathom water.

In entering from the southward, the passage is between Planjak islet and the little islet of Kamenjak on one side, and the islet of Petrara S. of it on the other, but a rocky shoal nearly in the middle of the entrance should be avoided by keeping on Planjak islet side, and thence between Kamenjak and Petrara. The depth of water between the sunken rock in the entrance and Planjak islet is four fathoms.

**Islets and Rocks.**—The principal of the other islets eastward of those forming port Badia and lying in the eastern entrance of Sabbioncello channel, are the Bisaza, Maizan, Goljac and Sestrice, but for their relative positions and the rocks and dangers around them, the seaman is referred to the chart. This end of the Sabbioncello channel is marked at night by the light on Sestrice islet, and the *red* light on Curzola mole on the S.; and the *green* light on Orebiccio mole on the N.

**LIGHT.**—On the larger Sestrice islet is a white square light-house, which exhibits at 58 feet above the sea a *fixed* white light, visible in clear weather from a distance of 13 miles.

Close to the light-house is a flag-staff by which vessels can communicate by the international code of signals.

**Directions for Sabbioncello Channel.**—The particulars already given of Torcola, Bacili, and Planchetta islets, suffice with reference to the Curzola channel. When making for the passage between Sabbioncello peninsula and Curzola, mount Vipera should be steered for. The entrance between Ossit point on the N. and the town of Raciste on the S. is quite safe, and will be readily distinguished; Ossit point at a distance appears to be a detached islet; St. Giovanni point, which is high, with a convent on it, will be next seen on the N., and Kneza point, which is woody and of moderate elevation, on the S. Between these points the channel is about half a mile wide, but clear and deep.

Proceeding eastward, a vessel may anchor in Rosario or Kuciste roads, or pass through the E. end of the channel, with the Sabbioncello shore aboard, and northward of all the islets and dangers. At night the *red*

light of Curzola and the white light of Sestrice islet will be left on the S., and the green light of Orebiccio on the N.

When entering the channel from eastward, the Sabbioncello shore should be closed, and a course steered northward of all the islets at the entrance; or, with a fair wind and the aid of the chart, the passage N. of Bisaza and Sutvara islands and through between Badia and Maizan may be taken, care being observed to give Lusnjak island a good berth. The course through from Bisaza island, distant 300 yards, and bearing SW.  $\frac{1}{4}$  S. is NW.  $\frac{1}{4}$  N.

The ordinary set of the current through the channel is to the westward, and its speed is sometimes considerably accelerated by strong easterly winds. Northerly and northeasterly winds are dangerous, as the N. side of Curzola island when westward of Ossit point is then a lee-shore and affords no shelter, and it is advisable in these winds to close with the S. side of Lesina island, so as to be enabled, if necessary, to anchor in Torcola channel, or to run under the lee of Curzola. In southerly winds, port Lesina, Torcola, or port Luka, may always be reached.

**CURZOLA ISLAND**, ancient *Coreyra Nigra*, is one of the most important islands on the coast of Dalmatia. It is 27 miles in length, from  $3\frac{1}{2}$  to four miles in breadth, with a chain of mountains, covered with oak and pine trees, suitable for shipbuilding, running from one extreme of the island to the other. The most remarkable elevation, mount Dobrovaska, is 1,940 feet high, and presents either a conical or a forked summit, according to the direction whence it is viewed. The inhabitants, about 7,000, are few in proportion to the area of cultivable ground; their chief occupation is shipbuilding and fishing; the vine and the olive are grown. Horse-roads run from the various anchorages to the interior. The island is in communication with Sabbioncello peninsula by electric telegraph.

The coasts, generally, have deep water close-to. The anchorages at the W. end are convenient to vessels navigating the eastern shore of the Adriatic, especially when overtaken by heavy southerly winds.

**Proisd Island.**—This island is about three-quarters of a mile in length, 94 feet high, and lies at the NW. extreme of Curzola, from which it is separated by a passage about 300 yards wide, and one fathom deep. The W. end of Proisd is bordered by a rocky bank, with three fathoms water on it, which extends off a quarter of a mile; the shoal water between the island and Curzola extends northward, with a little islet or rock on it, and beyond which, at a short half mile from Proisd, is the Bacili islet or rock, 15 feet high, with 11 fathoms water between the two islets.

At  $1\frac{1}{2}$  miles eastward of Bacili islet, and a quarter of a mile from the shore, is the little islet of Gorcik, 70 feet high; the N. coast line of Curzola, thence eastward, is bold and irregular, forming several coves, but affording no shelter whatever for large vessels.

**GRANDE BAY** occupies the whole W. end of Curzola island, and has good anchorage for large and small vessels. The town of Valle Grande is at the head of the bay. The best anchorage for large vessels is inside Ossiak islet, nearly at the head of the bay; this islet is 800 yards in length, E. and W., 400 yards in breadth, 220 feet high, and covered with bushes. The available space is nearly a square of about half a mile, with the depth of 18 to 26 fathoms, sand, and well sheltered, being open only to the WNW. The most secure place in the bay for small vessels is port Plitvipe, an indentation on the N. side of the bay. Here they anchor in eight to 13 fathoms, sand and mud, and make fast to the weather shore. There is also anchorage for small vessels off the town in from six to 12 fathoms, and a lane of water here runs a quarter of a mile to the N., suitable for vessels of very light draught.

At a short three-quarters of a mile to the NW. of Ossiak islet is the entrance to the small port of St. Giovanni, which has a depth of  $2\frac{1}{2}$  and two fathoms, and is much visited by coasting-vessels, being conveniently situated for getting under way. An islet of the same name, which has a church on its summit, and is joined to the shore by rocks occasionally uncovered, forms its S. side; the entrance is divided by the small Gubessa islet, to the northward of which is the proper channel, where there is a strong current at the commencement of ebb tide.

A mile to the NW. of Ossiak islet is the little islet of Kamenjak, 80 feet high; and about 800 yards W. by S. from the latter is a shoal with  $3\frac{1}{2}$  fathoms water on it; and at three-quarters of a mile to the WNW. of the same islet, and off a projecting point, is a five-fathom patch.

On the S. side of entrance to Grande bay is Potplat cove, which has a depth of eight to 13 fathoms, but is exposed to westerly winds, and the holding ground is bad.

**Directions.**—Mount Hum, a conical hill, completely covered with trees, rises 1,250 feet above the sea, immediately over the S. side of Grande bay, and indicates its position. On approaching the land, the high wooded point of Kenirat, on the S. side of entrance, and Proisd islet on the N., will be readily recognized; and a course may be steered for Ossiak islet, leaving Kamenjak islet and the  $3\frac{1}{2}$  fathom shoal on the port hand; both sides of Ossiak are clear of dangers.

**Tre Porti.**—Between Kenirat point and Cinca point, two miles to the SE., the coast is high, with two little coves; to the N. and E. of Cinca point is an inlet, at the head of which is port Tre Porti, the western-



most of the anchorages on the S. coast. It has room for small coasting vessels only.

Extending two miles in a SE. direction from Cinca point are four islets; Terstenik, the nearest to the point, is the largest, 83 feet high, and between it and the point is a clear and deep passage, 400 yards wide leading into port Tre Porti. Between Terstenik and the second islet the passage is rather wider than the former, and also deep and clear.

Persnic, the third islet, is 143 feet high, and united to the second islet by a shoal, with only two fathoms water on it. Lukovac, the outer and smallest of the four, is 52 feet high, and midway between it and Persnic the depth is 14 fathoms; but a rock above water lies in the inner part of the passage. These islets cover port Tre Porti, and break the sea.

**Anchorage.**—At  $1\frac{1}{2}$  miles to the NE. of Lukovac islet is the W. end of a chain of islets, rocks, and shoals, which skirt the coast for  $4\frac{1}{2}$  miles eastward; inside these islets small vessels find excellent shelter.

**Port Carboni** is formed between Zvirinovic islet and the shore of Curzola; it is about a mile in length, less than 350 yards in breadth, with depths of seven to 14 fathoms, weedy bottom, and is secure from all winds. The ordinary anchorage is abreast of some fishermen's dwellings, from which a road leads to the town of Blatta. Carboni is generally preferred by vessels wind bound in this part of the Adriatic, as its two passages enable them to leave with any wind. Firewood is the only supply which can be obtained.

**Directions.**—When approaching port Carboni from the southward, mount Hum will indicate its position, from which the eastern entrance bears about NW.  $\frac{3}{4}$  N. Zvirinovic islet is 255 feet high, and at a distance appears like two islets, and is the largest of the islets close to this shore.

When intending to enter the SE. passage, Obiak islet, which is sugar-loaf shape and covered with bushes at the top, will be recognized; and the pass should be taken between it and Zvirinovic to the westward. A shoal with  $4\frac{1}{2}$  fathoms water lies in the middle of the passage, and will be cleared by keeping the E. end of Zvirinovic islet aboard. The large rock above water farther in should be left on the port hand.

When bound to Carboni from the westward there are the passages between the islets, and between the latter and Cinca point, but the current, which is rapid between all these islets, should be considered before taking them.

**Port Tre Pozzi.**—The easternmost four of the chain of rocky islets form, with the coast of Curzola, a channel nearly 800 yards broad, afford

ing good anchorage in 16 fathoms, sand and gravel. Westerly and southeasterly winds send in a considerable sea.

**Directions.**—When bound to port Tre Pozzi, its position will be known by mount Morkan, which rises immediately N. of it. The above-mentioned four islets when seen at a distance present a low whitish line, standing out in relief from the dark ground of Curzola. Vessels visiting port Tre Pozzi should never pass between them, the breadth being small, the current strong, and the depth of water only three and four fathoms.

The eastern pass is between Verkovnjak islet, which is 1,112 feet high, and Otocac islet, which is close to the shore; there are shoal patches of four and  $4\frac{1}{2}$  fathoms in this entrance to the anchorage, which in a vessel of heavy draught should be avoided. The anchorage is about half way along the islets, or opposite the middle of the three largest.

The western pass is between Kosor and Stuppa islets; in this pass there is a three-fathom patch, a  $2\frac{1}{2}$ -fathom patch, and a rock six feet above water to be avoided, and for the position of these dangers, as well as for those in the eastern pass, the seaman is referred to the chart.

**Port Berna**, on the NW. side of Veli Zaglov point, has good anchorage for vessels of light draught, in three to five fathoms, sandy bottom. The customary precautions should be taken against the bora; cables are generally carried to the shore. Larger vessels anchor farther out in 20 fathoms.

**Coast.**—Veli Zaglov point is 255 feet high and well wooded; a rocky shoal with three fathoms water on it lies 300 yards westward of the point, which should have a wide berth in rounding. From Veli Zaglov point to cape Speo, the E. extreme of the island, the shore is rocky and steep-to, uninhabited, thickly wooded, and, with the exception of a few coves, without a single place of shelter.

**CAZZA ISLET** is the outer extreme of the chain of islands, islets and rocks which extend westward from the vicinity of Ragusa, and is uninhabited, except occasionally in the summer by shepherds who find pasture for their flocks. It is nearly  $2\frac{1}{2}$  miles in length, 810 feet high, and steep-to all round; the S. side is lower than the N., and forms a bay sheltered from northerly and westerly winds, but which is not a safe anchorage, and a vessel caught in a bora gale off the island should, if possible, make for Lissa island; failing in the attempt she would have Manfredonia to the SSW.

**LIGHT.**—On Gradisca point, the SW. extreme of Cazza islet, is a quadrangular light-house, painted red and white in vertical stripes, rising from the center of the keeper's dwelling, which is of two stories. It exhibits, at 308 feet above the sea, a *flashing* white light, visible in

clear weather from a distance of 24 miles. The light is obscured by the land from the northeastward between the bearings of about WSW.  $\frac{5}{8}$  W. and SW.  $\frac{5}{8}$  S.

**Cazziol Islet** is smaller and of less elevation than Cazza, being only 320 feet high, and from which it lies eight miles to the eastward; it is uninhabited and covered with brushwood and stunted trees. The shore is steep and the soundings around it, though irregular, are generally deep. At a distance of a little more than 800 yards off the SW. point of the islet is a rocky shoal with two fathoms water on it. Fishing-vessels resort in southerly winds to a small bay or cove on the N. side, which has a depth of 12 to 17 $\frac{1}{2}$  fathoms, sand, with a sunken rock close to the W. point of entrance; the SE. side is the best for landing.

Biclaz is a small round islet or rock, 71 feet high, steep-to, and lies 1 $\frac{1}{2}$  miles WNW. from the SW. end of Cazziol; at a third of a mile eastward of the rock, is a shoal spot with 10 fathoms water on it.

Lokovac is a little islet, 65 feet high, and steep-to, lying a quarter of a mile N. of Cazziol.

Another islet or rock, 52 feet high, named Cernac, lies about half a mile eastward of Cazziol; a nine-fathom patch lies a quarter of a mile NE.  $\frac{1}{4}$  E. of the rock.

The channel between Cazza and Cazziol is frequently used.

**Markiara Islet.**—This islet, about 1 $\frac{1}{2}$  miles in length, N. and S., and 464 feet high, is composed of several small woody hillocks; its seaward shores are steep, especially on the SW. side, and the water deep. There are no hidden dangers in the channel between it and Cazziol, which is 2 $\frac{1}{2}$  miles wide, but the current is rapid.

Pod Markiara is a little islet or rock, 65 feet high, lying half a mile off the NW. face of Markiara; the NW. side of this rock is foul, and should have a wide berth. Nearly midway between it and Cazziol, there is a rocky patch, with eight fathoms water.

Markiara islet is separated by a narrow channel from Priestap islet E. of it; there are two little islets or rocks on the shoal extending from Markiara in the N. part of the channel, and the least depth in the middle of the channel is 5 $\frac{1}{2}$  fathoms.

**LAGOSTA ISLAND**—ancient *Ladestum*.—This island, upon a point on the S. side of which is a light-house, is generally made by vessels passing either up or down the Adriatic. It is six miles in length, E. and W., high, with a peak near the center; the most elevated parts are well wooded, excepting seaward, where they are steep and barren. Mount Debelo Blezovo, the most elevated part of the island, is 1,368 feet above the sea, and covered with pine trees. St. Giorgio chapel, on a summit, is a little to the NE. of this elevation. The shores of the island

are bold, and with the exception of the SE. side are irregular, with deep water, and several rocky heads, to avoid which the chart must be the guide. There are about 1,200 inhabitants, many of whom are fishermen. Wine, oil, firewood, and salt-fish are the chief articles of commerce. The only village, Lagosta, is on one of the highest hills on the N. side; it is defended by a fort on a conical hill eastward of it.

**Port Lago Piccolo** is an indentation at the NW. end of Lagosta island; it is protected on the W. by the N. part of Priestap islet and the little islet of Maslonac, which is covered with bushes, off its N. point. The passage in is clear and deep, 300 yards wide, and leads to a land-locked anchorage, about 600 yards square, with 20 fathoms water, and room farther in for small vessels in eight or nine fathoms, thus affording good shelter from the bora, but difficult of ingress and egress in a sailing vessel.

Prikodisce, the E. point of entrance, is 223 feet high, the land immediately within it falls to 12 feet, and rises again, causing the point at a distance to appear as an island.

**Krusica Cove**, to the eastward of port Lago Piccolo, is half a mile deep, and has an anchorage at the head of it for small craft in eight fathoms. It is open to the bora and should be used only as a temporary shelter. The entrance is between Croce point on the W. and Sosau point on the E.; on the latter is mount Sosau 737 feet high.

**Port Chiave.**—This anchorage is resorted to by coasting vessels on account of its convenience to the vicinity of Lagosta village, which is about a mile eastward of it.

A small islet or rock at the entrance affords partial protection from the northward; the passage is on the E. side of the islet, as a reef of rocks nearly awash lies between it and the western shore. The anchor should be dropped near the middle in five or six fathoms, mud, and a cable taken to the islet. In this position, only northerly and northeasterly winds are much felt.

**Port Rosso.**—This small port is at the NE. angle of the large bay, on the S. side of Lagosta; the depths in the center of the port are five to six fathoms, mud, and only  $3\frac{1}{2}$  fathoms at the entrance, which is too narrow to be taken without a leading wind.

The bay in which the port lies has sufficient space and depth for vessels of the greatest draught, but it is not a safe anchorage, and should be resorted to only in the bora or during westerly winds; those between SW. and SE., blow dead in and raise a heavy sea.

The only spot which can be recommended as shelter in a gale is in 18 fathoms, under the lee of the high land of Skrigeva point, on the E. side of the bay.

**LIGHT.**—On the elevated land of Skrigeva point is a conspicuous white light-house rising from the keeper's dwelling, which exhibits at 342 feet above the sea, a *fixed* white light seen in clear weather at a distance of 25 miles. This light being on the S. coast of Lagosta is very important to the navigation of the Adriatic.

**Directions.**—When entering port Rosso with southerly or southeasterly winds, vessels under sail should be prepared for eddy winds from the high land. Skrigeva point may be rounded closely when arriving from eastward, and Svegliegamora the western point, when arriving from the opposite quarter. Care must be taken to avoid a rocky shoal with only one fathom water on it, lying in the bay two-thirds of a mile eastward of the latter point, and a third of a mile from the shore. There is also a shoal with  $4\frac{1}{2}$  fathoms, a quarter of a mile from the shore, in the middle of the bay, and another with  $1\frac{1}{2}$  fathoms, on the W. side of Svegliegamora point.

**Priestap Islet** forms with the W. end of Lagosta the ports of Lago grande and Lago piccolo; the islet is  $1\frac{1}{2}$  miles in length, 568 feet high, and separated from Lagosta by a narrow passage over shallow rocky ground, by which vessels of very light draught pass at high water, from port Lago Grande on the S., to that of Lago piccolo on the N. The current between the islet and Lagosta is strong.

**PORT LAGO GRANDE** is formed between the S. part of Priestap islet and the W. end of Lagosta, and has sufficient space for a number of vessels secure from all winds. Near the center of it is St. Raffaele islet, 70 feet high, with a church on it; the anchorage is either on the N. or S. of the islet, in 12, 18, and 26 fathoms, sand and gravel. Vessels of light draught may moor in the coves of Priestap, or in St. Pietro bay on the SE. side of the port. Brackish water may be had at St. Pietro bay near the church. Firewood is the only other article which can be obtained.

**Directions.**—There are narrow passages to this port between the shoal off Bushirat point and Bratinottok islet; between the latter and Vlassenik islet; and between Vlassenik islet on the one side, and Markiara and Priestap islets on the other. The rocky shoal extends nearly 200 yards to the NW. from Bushirat point, leaving the passage on the N. into the port about 500 yards wide; irregular currents of wind frequently occur among this group of islets.

Cazziol islet and mount Debelo Blezovo are good marks when approaching from westward. Bratinottok islet is 200 feet high, wooded, of whitish appearance, steep on the S. side, and may be recognized at some distance, and Bushirat point may be known by large red patches on its S. side.

Both winds and currents are frequently irregular and strong between Lagosta and the islets and rocks westward of it.

**LAGOSTINI ISLETS.**—To the eastward of Lagosta island are two groups of islets, rocks and shoals; the western group, lying within a radius of  $3\frac{3}{8}$  miles of the E. point of Lagosta, consists of four principal and ten smaller islets or rocks, ranging from a little above the water to 264 feet high, the largest islet being covered with bushes.

The Tajan, the two northernmost islets, extend over a space of about 800 yards; the larger is 62 feet high, and lies  $3\frac{3}{8}$  miles NE.  $\frac{3}{4}$  N. of the E. point of Lagosta, and  $1\frac{1}{2}$  miles northward of Markienda rock.

The Markienda rock rises three feet above water, about one-third from the SE. end of the reef of this name, which extends 800 yards to the NW. of the rock; the rock is nearly a mile NNE. from the E. point of Mladine islet. Markienda reef is two-thirds of a mile in length NW. and SE., and has  $1\frac{1}{2}$  to 3 fathoms water on it, and is steep-to.

Markienda biela rock, is small, round, and nine feet high; it lies more than three-quarters of a mile eastward of Mladine islet, and the same distance southward of Markienda rock. The above islets and rocks just described lie in a NNW.  $\frac{1}{4}$  W. and SSE.  $\frac{1}{4}$  E. direction from each other over a distance of nearly  $2\frac{1}{2}$  miles, and are the easternmost of the western group.

Between these and Lagosta are the larger islets, with rocks and shoals and deep water around and between them.

In taking the passage between the western group and the E. end of Lagosta, great caution is required.

The Lagostini or eastern group, consisting of nine small islets or rocks, extend E. and W.,  $3\frac{1}{2}$  miles nearly, and form a line of breakers.

The three western of the group are called the Sestrice islets, the largest of which is 60 feet high; at about three-quarters of a mile westward of the Sestrice is a rocky shoal with four fathoms water on it; and between these islands and Markienda biela rock to the NW., the passage is nearly three miles wide, and, with the exception of the four-fathom shoal, clear and deep.

The current through the passage is irregular and at times rapid; vessels from the southward prefer passing between the E. end of the group and Meleda island.

Glavat, the eastern of the Lagostini group, is a small round islet 88 feet high, and steep-to, except on the W. side; it lies W.  $\frac{1}{2}$  S. nearly, distant  $7\frac{3}{4}$  miles from the W. point of Meleda island. As the currents in the vicinity of these islets may be strong or irregular, the water deep, and the dangers steep-to, it will be well to give them a wide berth. They are often visited by fishermen.

**LAGOSTA and MELEDA CHANNELS.**—These channels may be considered continuations of each other; the former is between Lagosta island and Lagostini islets and rocks on the S., and Curzola island on the N.; the latter is formed between Sabbioncello peninsula and Meleda island.

In Lagosta channel the only dangers are the Tajan islets, which have just been described; the ordinary westerly current sets through it, and, when easterly winds accelerate it, troublesome eddies are caused at the western entrance. The Curzola shore with a southerly wind should be approached, in order to be in a position to seek, when necessary, one of the anchorages at its western end, but as there are no anchorages in the eastern part of the channel, it will be necessary in a vessel under sail to be on guard against a sudden fall of wind which may be succeeded by a sea.

In the winter season the bora blows heavily in this channel, and it is prudent to endeavor to reach port Rosso or other shelter at the first symptoms of its approach, to avoid the necessity of bearing-up for Manfredonia, or of lying-to under the lee of the island. In Meleda channel, the ordinary westerly set of current occurs, excepting in the winter season, during easterly winds, when the direction is generally about WNW. Southerly and southeasterly winds raise a heavy sea, especially on the Sabbioncello shore, which it is then well to avoid, as they seldom blow home. With the bora, a vessel should keep as near as may be safe to this side.

**MELEDA ISLAND.**—This island, the *Melita* of the ancients, is the southeasternmost of the larger islands of Dalmatia. It is 20 miles in length, with an extreme breadth of about two miles, and consists of a series of wooded hills with a deep depression at about one-third from its E. extreme, and appears, when seen from the northward, like two groups of islets. Its highest part, mount Velki Grad, 1,700 feet above the sea, is near the center; the N. side of the island is wooded and well cultivated; the opposite is a rocky sterile country, excepting in the vicinity of the western extreme, where there is an extensive pine forest. There are about 1,500 inhabitants, whose principal occupations are agriculture and fishing. There are six small towns or villages, the chief of which is on the southern slope of mount Velki Grad. The S. coast is rocky, barren, and without any anchorage whatever, and should not be closely approached. The N. coast is easy of access and has one or two anchorages.

**Port Palma**, at the W. end of Meleda, is sheltered by an irregular forked-like projection, which terminates in Lastovska point, the western extreme of the island, and trending northward forms with the coast

E. of it an inlet, affording anchorage for small vessels. The inlet is about 1,400 yards in length, from 250 to 500 yards in breadth, and sheltered on the NE. by Pomestak islet, which is 205 feet high, whitish at the base, and covered with brushwood at the summit. Vessels anchor southward of the islet, in 16 to 21 fathoms, and make fast to it; and farther down the inlet on the S., is about 12 fathoms, sand and mud. The passage in is between the NE. extremes of the point, which form a fork on the starboard hand, and two small grayish-colored islets or rocks, together with Pomestak islet, on the port hand.

The land of Lastovska point is an irregular elevated strip, and forms a good mark. The NW. or Cerna Seka islet in front of the entrance is shoal all round, and should not be approached too near. A small islet immediately N. of Lastovska point, and a long 200 yards from the shore, is also foul.

**Port Polazzo** is a bay formed by two points of land, about two miles apart, between which are four rocky islets. The islets form with the points four entrances into the bay, where there are several good anchorages; the port is at the head of the bay, westward of the islets, and abreast of the ruins of a palace, whence it is said to derive its name, and has a depth of seven to 12 fathoms, mud; vessels also anchor between the islets and the shore eastward of the narrowest part of the port, but in deeper water.

The bay from the inner islet is about a mile deep, the narrowest part being contracted to less than 300 yards in breadth, with six and seven fathoms water at its head; in the SW. corner the shore is bordered by shallow rocky ground, which extends off more than 200 yards.

**Coast.**—From Lastovska point, the N. coast of Meleda eastward to port Polazzo, a distance of about  $3\frac{1}{2}$  miles, is irregular, with several islets and sunken rocks, the latter being near the shore and mostly within Glavat, the N. or outermost islet, which is steep-to. At 250 yards off the E. head of Stupe point, and more than three-quarters of a mile from the western entrance to port Polazzo, is a sunken rock, on which the sea breaks.

The islet of Kobravac is nearly  $1\frac{1}{2}$  miles in length, of little breadth, lies E. and W. along the shore of Meleda, and covers a narrow space of less than 200 yards to nearly 350 yards in breadth; the other three islets are smaller, and lie to the N. and W. of it. These islets range to 336 feet in height.

The anchorage most frequented for temporary purposes is between Kobravac islet and the shore of Meleda in 17 to 23 fathoms, sand and mud; a better berth is more to the westward between the W. end of Kobravac and Tainic islet. Polazzo is considered one of the best ports



of Dalmatia, but its space is rather limited, and the islets at the entrance render access difficult in a vessel under sail.

**Directions.**—In making for port Polazzo, Lastovska point, the W. extreme of Meleda, will be readily recognized; the land is thickly wooded, and the four rocky islets above mentioned present a barren whitish aspect. In southerly winds a vessel should be prepared in the narrow passages between the islets for sudden heavy squalls. In taking the western pass between Stupe point and Moracnik islet, the former should be closed in order to keep clear of the rocks awash near Moracnik; but vessels of large draught should avoid this passage, as shoal water extends into it both from the S. end of Moracnik and the point opposite, contracting the deep water to very narrow limits. Small vessels should here keep mid channel.

In taking the other passages a mid-channel course should be followed, the points of the islets being foul, especially Moracnik and Ovrat.

**Port Mezza Meleda** is about  $8\frac{1}{2}$  miles eastward from the E. entrance to Polazzo; the intervening coast is straight, with deep water close to, and affords no shelter. Port Mezza Meleda consists of two bays, and is a convenient port for wind-bound vessels, if a berth be chosen with reference to getting under way with a fair wind. The anchorage for vessels of large draught is in 35 fathoms, sand, in the westernmost part of the bays. The northern shore, where the depth is 16 to 27 fathoms, sand, should be preferred, being the best sheltered from winds from this quarter. A point in the SW. side of the bay is bordered by rocks; and another rock lies near the N. shore in the inner part. At about a third of a mile westward from Badanj islet, at the E. point of the bay, there is a rocky bank with eight fathoms water on it, which should be avoided when taking up a berth between the two bays. The shores are backed by well-wooded hills.

**Directions.**—The position of port Mezza Meleda is easily distinguished, being in the depression of the land between Mali Grad and Velki Grad. In passing between Pusta point on the starboard, and Badanj islet on the port hand, the former should not be closely approached, as a shoal with a rock awash extends nearly 100 yards to the NE.

**Coast.**—From port Mezza Meleda the coast eastward to Gruj point, the E. extreme of Meleda, is irregular, with deep water, and one or two little islets or rocks close to it. At  $1\frac{1}{2}$  miles from Mezza is a small bay or cove, with 10 fathoms water, partially protected on the N. by three little islets, the northern of which has a sunken rock off its NW. end; the bay is called port Chiave. At three-quarters of a mile beyond the northern islet, off the E. side of Maharci point, is a shoal with  $2\frac{1}{2}$  fath-

oms water on it. Gruj point, the E. extreme of Meleda,  $4\frac{1}{2}$  miles farther on, is a peninsula 491 feet high, terminating in three or four small points, with a bay or cove on either side of it. At about 350 yards from the SE. face of the point is a shoal with four fathoms water on it, and 17 fathoms between it and the shore.

The eastern end of Meleda forms, with Ginpana and Jaklin islands, the eastern entrance of Meleda channel, which is seldom entered, excepting by coasting vessels on their way to Sabbioncello channel.

**South Coast.**—Along the S. coast of Meleda the water is deep, and there are no places of shelter whatever; the whole coast is exposed to SW. winds and sea. Temporary anchorage in fine weather may be found, by a small vessel, at port Inganatore, near the entrance to Lago Grande, on the S. side at the W. end of the island. A small islet or rock here and there lies off the coast, but little beyond the distance of half a mile, and as there is nothing to be gained by nearing the coast it will be better to avoid it.

**CALAMOTA CHANNEL** is formed at the S. extremity of Sabbioncello peninsula, by several small islands and islets which run parallel with the coast of Dalmatia as far as port Malfi. It is 12 miles in length, and from three-quarters to a mile in breadth; the shores afford excellent anchorage, and the channel is easy to enter at all seasons of the year, and may be included among the most important anchorages in the Adriatic sea. The holding ground is good almost throughout.

**Olipa**, the northwestern of the small islands, forms with Nosize point, the SE. extreme of Sabbioncello peninsula, an entrance called Bocca Inganatore, leading to Calamota and Stagno channel. The Bocca Inganatore is too long and narrow to be considered easy even with a commanding breeze; the steep rocky shore is of bold approach; the summit of Olipa, 645 feet high, is covered with bushes; Nosize point is uncultivated and overgrown with impenetrable brushwood.

Port Ladro is on the NW. side of Olipa, where a vessel of large draught may moor, sheltered from all winds.

**LIGHT.**—On the S. end of Olipa island is a small white stone tower, which exhibits at 103 feet above the sea a *fixed red* light, visible from seaward between the bearings of ESE.  $\frac{3}{4}$  E. and WSW.  $\frac{1}{2}$  W., a distance of nine miles.

**Jaklian Island**,  $2\frac{3}{4}$  miles in length, southeastward of Olipa, forms with it the second narrow passage, called Bocca falsa, leading to Calamota channel. The passage is contracted to about a quarter of a mile in breadth by rocks awash off the NW. extreme of the island. Four small islets or rocks lie on the NE. shore, forming with it good anchorages for small vessels. The first, or northwestern of these, in 18 fath-

oms, gravel and shell, is southeastward of Tajan islet, which is covered with brushwood; the second is southwestward of Cerkvina islet, in 15 fathoms, mud; and third, with Kosmec islet bearing about WSW.  $\frac{1}{4}$  W. or SE. by E.  $\frac{3}{4}$  E., and in either position protected from the bora.

The passage between Jaklian and Olipa island should not be attempted in sailing vessels with SE. winds or with the bora; calms and eddy currents setting towards the shore are of constant occurrence. It is occasionally used in northwesterly winds; after passing Olipa the vessel should be kept close hauled on the port tack until beyond Tajan islet, and certain of weathering Misnjak islet, as the wind often hauls more to the northward in Maestro bay.

Jaklian island may be easily identified; its center is elevated to 752 feet above the sea, and is a blanched stony peak; the S. shore is rocky and precipitous; the N. side is covered with brushwood interspersed with cultivated patches, and there are a few houses on its eastern extreme.

**GINPANA ISLAND** lies eastward of Jaklian, and between them is the third passage into Calamota channel, called Pompejana strait. The NW. part of Ginpana overlaps Jaklian, and a projecting point from the Ginpana forms a very narrow tortuous passage which is seldom used. If a vessel should be forced to attempt this passage, the Ginpana shore should be kept close aboard so as to avoid the rocks in the SW. angle of the pass, and to be enabled to anchor if necessary; the inner part of Ginpana point forming the pass is foul.

Ginpana is  $4\frac{3}{4}$  miles in length, nearly  $1\frac{1}{2}$  miles in breadth, its northern part 794 feet high, and is the largest and most thickly peopled of this group of islands. It may be recognized by the coniform mount St. Ullia, 762 feet high, about one-third from its SE. end; the shores are rocky and bold; near the coast is a series of rocky wooded hills with fertile valleys; farther inland is a rich plain, upon which are grown the vine, the olive, and all kinds of fruit.

**Luka Cove.**—The NW. coast of Ginpana forms with Jaklian island a deep bay, protected on all sides; the bottom throughout is hard mud, and vessels may safely anchor in any part, near enough to the shore to lay out cables to it.

Luka cove, at the head of this bay, has sufficient space for several vessels, and it would be preferable to all the other Calamota anchorages, if it were not so far from the mainland, and difficult of access in southwesterly winds. Luka village is close to the shore at the head of the cove.

**MEZZO ISLAND**, southeastward of Ginpana, forms with it the fourth passage into Calamota channel, called Mezzo strait, which is one of

the best, especially in northwesterly winds. Rudda islet, which lies between the inner points of the two islands, reduces the breadth of the passage to about two thirds of a mile, and it would be impracticable to beat through with southeasterly or northerly winds, or in any other than fine weather.

Shoal water extends a quarter of a mile to the NW. of Rudda, with a small rock on it, and another rock named Marnic lies off the N. extreme of Mezzo.

A vessel unable to weather Rudda, should not attempt to pass between it and Ginpana, on account of the shoal northwestward of the islet, which would necessitate too close an approach to the latter; she should rather anchor under the lee of Mezzo in about 22 fathoms.

Mezzo is nearly  $2\frac{1}{2}$  miles in length, 634 feet high, and forms a bay both on the NW. and SE. sides; its SW. and NE. sides are rocky, and bordered at a short distance by reefs. It contains about 700 inhabitants, chiefly mariners; the soil is fertile, the vine and olive flourish, and several flocks of sheep find pasture.

**Anchorage.**—Mezzo strait affords good anchorage for vessels prevented by calms or contrary winds from proceeding through Calamota channel, both in St. Giorgio cove, Ginpana, W. of Rudda islet, where vessels come to abreast of the village, in eight to 11 fathoms, excellent holding ground; and in Mezzo road, a small bay, at the head of which is a village. The road is sheltered from easterly and southeasterly winds, but those from westward send in considerable sea; the best berth is in the middle of the bay in 11 to 18 fathoms, mud and sand.

**Calamota Island** is the easternmost of the islands, and with Mezzo forms Calamota strait, leading to the channel; being very short it is easily taken, even with a scant wind. Between the opposite points of the two islands is a rocky bank with little more than one fathom on it, known as Cavalika shoal; it is marked by a buoy anchored in 26 feet of water at low tide, *conical* in shape, surmounted by an *openwork ball*, and the whole painted *white*. It is situated on the NW. extremity of the shoal, on the following bearings:

Donzella light-house (St. Andrea) .....	S. 21° 48' W.
Polughe point, Mezzo island. ....	N. 72 49 W.
Cavalika point, Calamota .....	S. 69 59 E.
Rataz point, Calamota .....	N. 65 01 E.

The pass is between the buoy and Mezzo, but there is a depth of eight fathoms between it and Calamota.

Calamota is smaller than Mezzo; the western portion is 444 feet high, and covered with pine trees; on the remainder are grown the fig and the olive. It contains about 400 inhabitants.

**Anchorage.**—The SW. shore of Calamota, which is rocky and thickly overgrown with bushes, forms a bend, in which refuge may be taken from a bora, in 12 to 18 fathoms, at between 300 and 600 yards from the shore; both inside and outside of this distance the bottom is rocky.

In the small bay on the SE. side of Mezzo, and westward of Palughe point, there is a good shelter from northerly and westerly winds, but a heavy sea is sent in by those from SE. The best berth is near the middle of the bay, in four to nine fathoms, sand; the N. shore is lined with breakers. When approaching from the southward, a berth must be given to the rocks at the S. point of the bay. At about 600 yards to the SE. of the point is the little islet of Skupielli, 50 feet high; and a shoal, with three fathoms water on it, lies off its E. side.

There is also anchorage near the middle of the small bay, at the N. extreme of Calamota island. Vessels should not proceed too far in. Northwesterly winds only are much felt here; the holding ground is good.

**St. Andrea**, a high barren rock or islet, precipitous on the SW. side, with a convent on it, lies rather more than  $1\frac{1}{2}$  miles southward of Mezzo, and serves to point out the passage.

**LIGHT.**—On the NW. or highest part of St. Andrea islet is a light-house, which exhibits at 223 feet above the sea a *fixed* white light varied by *red flashes* every *fifteen seconds*, and visible from a distance of 14 miles.

**BOCCA GRANDE.**—Between Calamota island and the Pettini islets or rocks is the sixth passage to the Calamota channel; it is the largest, being  $1\frac{1}{2}$  miles wide, clear of danger, and is the most frequented, especially by vessels from the southward. The water close to the islets is deep, but as the current is strong they should not be closely approached. This passage may be easily recognized by mount Petka, a hill 720 feet high, and by the Pettini, a line of small abrupt islets or rocks of reddish color, near Petka point, on the SE. side of entrance; and at night, by St. Andrea, Pettini, and Ragusa lights.

There is also a narrow pass between the shore and the Pettini islets, which is sometimes convenient for small craft with local knowledge, in order to keep to windward in northeasterly winds. In the middle of it there is a rock, which shows at low water, and which should be left to the eastward.

**LIGHT.**—On the outer of the Pettini islets is a light-house, which exhibits at 88 feet above the sea a *fixed* white light, visible 11 miles.

**Stagno Channel** is an inlet in Sabbioncello peninsula, and a continuation for five miles to the NW. of the Calamota channel; it is three-quarters of a mile wide at the entrance, and narrows towards the head at the

town and fort of Stagno, thence across the peninsula to Stagno piccolo the distance is about two-thirds of a mile. It affords good anchorage everywhere under its northern shore for  $3\frac{1}{2}$  miles up, where there are 10 fathoms water, thence it carries from  $2\frac{1}{2}$  fathoms to half a fathom to its head. It is not, however, often visited, being rendered very unhealthful, especially in summer, by northwesterly winds which traverse extensive salt marshes; but it would be a convenient temporary refuge for a large vessel obliged to enter the channel by Bocca falsa, if unable to reach Maestra bay. Small craft moor abreast of Kabas village, and larger vessels anchor N. of it.

The rise and fall of the tide is one foot to 18 inches; at low water the mud-banks at the head of the inlet emit very noxious exhalations. Stagno town is nearly deserted, and in a ruinous condition, but small supplies of water and provisions may be obtained.

**LIGHTS.**—At the town of Stagno is exhibited from the mole a *fixed red* light visible two miles. This light is on an iron standard with stone base and 11 feet above the sea-level.

From Brozze mole, Great Stagno channel, is exhibited a *fixed red* light, visible two miles; it is shown from an iron standard at a height of 11 feet above the sea-level. This light cannot be shown during a SW. gale.

Position of Brozze Mole; latitude,  $42^{\circ} 49' 20''$  N., longitude,  $17^{\circ} 43'$  E.

**Maestro Bay** is the largest and best anchorage in Calamota channel. The northern shore between Budina cove and port Slano should be preferred, and it is customary, in anticipation of a bora, for small vessels to lay out cables to it. The depth near the middle is about 32 fathoms, greenish mud; and 11 to 22 fathoms, sand and mud, at a short distance along the shore.

In calms or contrary winds, the coast between Doli bay and Budina cove should not be approached in a sailing vessel, as submarine springs of water occasion considerable eddies. Budina and Janska coves and Doli bay afford good shelter to coasting vessels.

**Water.**—There is an excellent watering place on the mainland about one mile northward of port Slano; it is in a little shingly bay, and may be known by a small church close to the beach.

**Port Slano** is a fine harbor between Dolnji and Gornj points, on the mainland, opposite the N. extreme of Ginpana. It is a mile in length, from 500 to 800 yards in breadth, with from eight to 18 fathoms water, better protected from the bora than any other of the Calamota anchorages, and sheltered from southeasterly winds, in which it can be entered without any difficulty; the land-breeze which generally blows at night facilitates departure. The holding ground is mud and generally good.

Osmine bay should be avoided, as the bottom is rocky. Port Slano is so situated with regard to the two southern passages to Calamota channel, that it may be entered in the heaviest SE. winds.

Dolnji point, on the NW. side of entrance to the port, is bordered by a rocky shoal at the distance of about 100 yards, and a similar shoal surrounds Gornj point. There is anchorage outside near Gornj point, the sea sent into the channel by sirocco winds being but slightly felt here.

**Water** in abundance may be obtained from a stream on the eastern shore, not far from Slano village, which is near the head of the port, and communicates by a good road with Ragusa.

**LIGHT.**—A *fixed* white light is shown from Doluji point on the NW. side of entrance to port Slano, at an elevation of 49 feet above the sea, and visible five miles. The lantern is on the S. angle of the keeper's dwelling.

**Anchorage in Mid-channel.**—One of the best anchorages in Calamota channel is between Calamota island and the mainland. Large vessels seeking shelter from a SE. gale generally come to, in about 15 fathoms, sand and hard mud, with St. Andrea islet in range with the W. extreme of Calamota island; here the swell from outside is felt, but southeasterly winds seldom last long enough to raise a heavy sea. This anchorage may be easily reached in southeasterly winds, and can be quitted without difficulty with any wind; but as it is impracticable to lay out cables to the shore against the bora, it should not be resorted to with the intention of making a long stay.

Vessels never anchor in mid-channel when anticipating bad weather, but on entering from southward proceed to port Malfi, or, if prevented by stress of weather, to the anchorage in Calamota bay, on the NW. side of the island.

**Port Malfi** is formed by an inlet about a mile in length, with an average breadth of 400 yards. Southwesterly winds raise a considerable sea, from which the only good shelter is in the coves on the western shore. Abreast Malfi on the W. side of the port is a shoal with  $2\frac{1}{2}$  fathoms water on it.

The best anchorage for a large vessel is in Soline cove, with cables to the shore against the bora, which blows violently. Veliki-Zaton cove is fit for small vessels only. Malfi is preferred to Gravosa and Ombla, being of easy entrance in SE. winds, and easily quitted in those from NW.

The shores are exceedingly picturesque, particularly at Mali Zaton bay, at the foot of a hill, the base of which is covered with vines and olive trees.

When taking the channel from southward between Calamota and Pettini islets, the entrance, which is immediately opposite, will be readily distinguished, as also Daxa islet, which lies in the middle of the passage to Ombla and Gravosa, and upon which are some batteries, a convent, and a light-house.

**Water.**—Vessels frequently visit this port to obtain water on the northern shore, from a stream on which are some mills.

**LIGHT.**—The light-house on Daxa islet is on the N. end, and exhibits a *fixed red light*, visible nine miles.

**Ombla Inlet.**—Vessels anchor close to the winding northern shore of this long narrow inlet to avoid the bora, which sometimes blows violently in the direction of its length. Southerly and southwesterly winds send in a swell, but do not last long, and are never very inconvenient. Both shores are covered with dwellings amid gardens and other cultivated grounds, to which the inhabitants of Ragusa resort in the hot season.

Owing to its narrowness and length, the inlet is not easily reached in a vessel under sail without a favorable wind, especially in the winter, when the outgoing current caused by the stream is very strong. In the event of the wind failing at the entrance, it would be advisable in a sailing vessel to come to in the vicinity of Daxa islet, and to warp or tow to the anchorage, if not convenient to wait for a breeze.

Between Port Malfi and Ombla the coast affords excellent shelter in from 18 to 21 fathoms, green mud and sand. This shore is sterile, and has few inhabitants; westward of Malfi it is covered with habitations and is well cultivated. This E. end anchorage and port Malfi are convenient in southeasterly winds for vessels bound to, but unable to enter, port Gravosa.

**Water.**—A fine stream of excellent water, the ancient *Arione*, empties into the head of Ombla inlet. Boats drawing eight feet water ascend to the source, about a mile beyond.

**PORT GRAVOSA**, on the S. side of the entrance to Ombla inlet, from which it is separated by Cantafigo point, has not much anchorage space for large vessels, the shores and the head of the port being bordered by banks of mud, with three and two fathoms water on them, deposited during heavy rains; there is, however, a channel of deep water, decreasing from 15 to six fathoms, which runs in for nearly half a mile. Vessels belonging to Ragusa, wintering here, moor in the middle, and secure to the northern shore, being there greatly protected from the bora squalls which blow violently over the high hills; heavy gusts are also felt with sirocco winds, but the water is always smooth.

The shores, like those of Ombla inlet, are scattered with villages, sur-



rounded by cultivated grounds, which afford a pleasant summer retreat for the inhabitants of Ragusa. Vessels of considerable size are built here of oak from the forests of Dalmatia, and from Meleda and Lagosta islands, the planking and masting being procured at Fiume. Water and provisions of all kinds may be obtained.

A berth will be found with the anchors in 11 fathoms, mud, and the stern secured in  $3\frac{1}{2}$  fathoms to the NE. shore, where there are mooring bollards at convenient distances. The holding ground, except on the N. shore, is indifferent, being soft mud, and as large vessels visiting the port must lie in mid-channel, unless properly moored, they are liable to drag their anchors. This is a very snug harbor, sheltered from all winds, and capable of containing some 40 or 50 vessels. Two French ships of the line, two Austrian frigates, twelve steam vessels of war, and about a dozen merchant vessels have been here at the same time. The line of battle ships were anchored in the roadstead, between Ombla inlet and Daxa islet.

A rock with 10 feet water on it lies off the N. shore; it is marked by a beacon buoy; there is a passage with a depth of  $3\frac{1}{2}$  fathoms inside of it. There are five to nine fathoms on the W. side of this rock, but the bottom is foul. Another beacon buoy marks a rocky shoal extending from the S. or Lapad side.

There are three mooring buoys in the approach to port Gravosa, one in front of Ombla inlet used as a warping buoy, and two others in Daxa channel. Also two mooring buoys in the port, for convenience of small steamers.

**LIGHT.**—A small *fixed green* light is shown from the NW. angle of the new boat landing, Laudon mole. The light is elevated 18 feet above high water and 17 feet above the ground, and indicates the landing place. It is visible two miles.

**Lapad Bay**, between Lapad point and Pettini islets, is resorted to by small craft for protection against the bora and sirocco gales. The anchorage is in 14 fathoms. Petka and Lapad points are high and covered with trees.

**DIRECTIONS.**—Mount Timor, which rises over Maestro bay at an elevation of 2,954 feet above the sea, is the commencement of the high land running parallel with this part of the Dalmatian coast; the mount is a good mark for approaching from the westward the various passages to Calamota channel; it opens well out on the left from the chain of mountains in the interior, and its bare, rounded summit may be seen at a great distance overtopping the surrounding land. Mezzo, and then the other islands, will subsequently appear, and the choice of passage determined. When approaching from the eastward, the high land

near Ragusa should be steered for as soon as visible, in order to profit by the westerly current along the coast. In southeasterly winds vessels should beware of heavy squalls over Lapad bay and out of Ombla inlet, which draw more eastward than the regular breeze. The coast between Pettini islets and Ragusa is bold and covered with bushes.

In proceeding to Ombla, or to Gravosa, either side of Daxa islet may be taken. In passing to the southward, between it and the two hillocks crowned by a battery, the Daxa side should be preferred, as a shallow bank borders the opposite coast. Between the batteries near Lapad point, and the entrance to Gravosa, the shore should be avoided when anchoring outside, as it is bordered by rocks overlaid with mud. Its northern edge is marked by a buoy. Near the entrance of port Gravosa, on the coast of Lapad, is a shoal on which is a beacon in the form of a pyramid, with an iron rod and vane eight feet above the sea.

**RAGUSA.**—The town of Ragusa is prettily situated, surrounded by a fortified wall, the greater part of which is washed by the sea, and commanded by fort Imperial on a hill 1,350 feet high. The environs are well cultivated, and have numerous handsome dwellings. Ragusa was formerly a rich republic of 40,000 inhabitants, and like Venice traded to all parts of the world; it has now dwindled to 10,000, of whom a large number are mariners, who carry on a considerable commerce in arms, salt, rice, &c., which are exchanged for grain, wood, and cattle, brought from Herzegovina.

A cove on the E. side of the town, called port Cassone, has space for a few small vessels in about two fathoms water. SE. winds cause a heavy sea at the opening into the port, which is between two small moles, rendering entrance difficult and at times impracticable.

The Austrian Lloyd's steam vessels call here twice a week to and from Trieste, and it is an electric telegraph station.

**Water** may be obtained from an aqueduct near the lazaretto, at a short distance eastward from the town.

**The Road** is between the town and Lacroma island, and has a depth of eight to 15 fathoms; it is exposed to a heavy sea in SE. winds, at the first symptom of which it is the custom for vessels to weigh and proceed to Calamota channel, or, if obliged to remain, to haul close under the N. shore of the island, and make fast to stone pillars provided for the purpose. In this position they often ride out heavy weather. This anchorage is resorted to in the summer season only; it is almost the only one on the coast of Dalmatia at which cables are laid out to the shore against SE. winds.

**LIGHT.**—On the extremity of the mole at Ragusa (port Cassone), a *fixed red* light is shown 25 feet above the sea, visible seven miles.

**Lacroma Island**, the shore of which is rocky and steep-to, is in a N. and S. direction nearly a mile in length, from 200 to 320 feet high, and when seen from southwestward appears to be divided into two at the middle; it has a fort on its northern part.

**Mount Snieznica** is a good guide to Ragusa, rising about 12 miles to the eastward and  $4\frac{1}{2}$  miles inland. It is 1,070 feet above the sea, with a bare summit, and may be easily recognized, being one of the highest points on this part of the coast, and between it and the mountains bordering the gulf of Cattaro the land is comparatively low. On a near approach fort Imperial, which is visible at a great distance, indicates the position of the town and anchorage.

**Breno Bay.**—Between Ragusa and Pellegrino point, a distance of  $3\frac{1}{2}$  miles, is a barren rocky shore, close-to which the water is deep. Immediately eastward of Pellegrino point is Breno bay, the E. side of which affords good anchorage for vessels of any draught in bora and SE. gales; the bottom is greenish mud, mixed with shells and gravel, or with sea-weed. A heavy sea is raised by southwesterly and northwesterly winds when it is necessary to avoid anchoring close-to the shore. In these winds small craft generally resort to port Tiha, the little indentation on the E. side of Ragusa Vecchia town, where they secure to the shore, the anchor otherwise not holding in the weedy bottom.

St. Pietro islet, about 400 yards in length, and 46 feet high, is nearly in a line joining the two points of the bay, and about 1,000 yards from St. Rocco point, the extreme of the little peninsula upon which is the town of Ragusa Vecchia. Between St. Pietro and St. Rocco point is a rocky bank awash, about 200 yards in extent.

Breno village, N. of the bay, and which is in a plain surrounded by high land, is rather extensive; the low grounds in its vicinity being well sheltered, are thickly planted with vines and olive trees.

Water is obtained from a river which flows out close-to the village. The water of Gliuta rivulet, in the E. part of the bay, is unfit for drinking.

**Directions.**—Mount Strazistje, 2,320 feet high, about  $1\frac{3}{4}$  miles eastward of the anchorage, is a good distant mark for vessels making for Breno bay. It is advisable to make the land well to the eastward, on account of the westerly current. Large vessels should take the passage between Pellegrino point and St. Pietro islet. There is a passage between St. Pietro and St. Rocco point, but the rocky bank nearly midway should be avoided.

**RAGUSA VECCHIA.**—The town of Ragusa Vecchia occupies the site of ancient *Epidauros*, on the little promontory in the SE. part of Breno bay; the inhabitants, who number about 3,000, are chiefly

seafaring men. The ground in the immediate neighborhood is well cultivated; at a very short distance the land is high and barren.

The port of Ragusa Vecchia is formed between the peninsula on which the town stands, and a projecting tongue of land on the SW.; it is open to the NW. It is about a third of a mile deep, and from 200 to 400 yards in breadth, with depths decreasing from 10 to three fathoms at its head. It has space for a few small vessels only, which haul close in and make fast to the shore.

A rocky shoal, with only one fathom water on it, extends more than 200 yards to the SW. from St. Rocca point on the N. side of entrance. Fronting the entrance of the port, and nearly a quarter of a mile from the S. point of entrance, is a rocky shoal with  $1\frac{1}{2}$  fathoms water on it, and four fathoms around it; this latter depth is over a space of about 300 yards in length, and steep-to. The N. edge of the shoal is marked by an iron staff and skeleton ball.

The passage into the port is between this latter shoal and that of St. Rocca, or between the shoal and the S. point of entrance.

Water and small supplies of provisions may be obtained.

**Merkan and Bobara Islets.**—These two islets with six or seven large rocks constitute a chain extending nearly  $1\frac{3}{4}$  miles in a NW. and SE. direction, and afford protection from the SW. both to Breno bay and Ragusa Vecchia.

Merkan islet, the larger, and 227 feet high, is the easternmost, and has some ruins on it; it has scattered rocks near the shore here and there, but otherwise the water is deep.

Bobara, the smaller islet, being 167 feet high, is the northwestern, and, like Merkan, has a chain of rocks running to the SE. leaving a clear opening between them and Merkan. These islets have steep, rocky coast lines, and the current between them and the mainland is about half a mile an hour to the NW.

**The Coast** between Ragusa Vecchia and point d'Ostro on the N. side of entrance to the gulf of Cattaro, a distance of about 18 miles to the SE., is rugged and of forbidding aspect. It is backed at a short distance within by high mountainous land, and covered here and there with trees. The depth is considerable near the shore, and it should have a wide berth, as the sea breaks heavily in strong sea winds, and violent eddies are caused by the current during succeeding calms or light winds.

**Ports Great Molonta and Little Molonta.**—At about six miles to the NW. of point d'Ostro is a small, steep, rocky, peninsula with a projection to the NW., and another to the SE., forming a bay on either side. The first and northwestern of these is called Great port Molonta,

but is considered merely a temporary refuge from a SE. gale for vessels which may contrive to reach it before the wind has attained great strength. It is open to the NW., whence a heavy sea at times sets in. There are 13 fathoms, soft mud and sand, at the entrance, and about seven fathoms at the head, but here several vessels have sunk and fouled the anchorage. It is usual to anchor near the middle and lay out cables to the shore against the bora.

Molonta islet, with a large rock on its NE. side, detached from the southern projection of the peninsula, add to the shelter of Little port Molonta, which is quite safe for small vessels in a bora, and in north-westerly winds. Southeasterly winds send in a heavy sea, but there is no danger if the vessel be properly moored in a good berth before bad weather sets in. The depth is between four and  $5\frac{1}{2}$  fathoms, sand, gravel, and shells; good holding ground. Water of good quality, but not in abundance, may be obtained here.

**Directions.**—The small vessels which frequent Little port Molonta do not attempt it with southeasterly winds and rough weather, owing to the sea and strong current, then found at the narrow entrance between the rock and the mainland. Neither is it advisable to attempt to enter either of these ports early in the forenoon, as even a fresh SE. breeze commonly fails on a near approach to the land at that time, and a heavy sea would probably be encountered.

Mount St. Elia, which is 1,858 feet high, with a chapel on its summit slopes to the shore about three miles to the northward; this, and the high lands of Cattaro southward, sufficiently point out the position of the ports Molonta, and on nearing the peninsula its grayish wall-like sides will be easily recognized. The country in the vicinity is covered with bushes.

## CHAPTER XII.

### COAST OF DALMATIA AND ALBANIA FROM POINT D'OSTRO TO VALONA BAY.

VARIATION in 1883.

Point d'Ostro, 8° 24' W.

Cape Linguetta, 8° 09' W.

The Dalmatian portion of this coast, from point d'Ostro to Dubovica point, embraces about 70 miles, including the sinuosities of the gulf of Cattaro. Like the rest of the coast of Dalmatia it is backed at a short distance inland by a chain of mountains, and is generally of bold approach. The adjacent country is populous, well wooded, and fertile; the vine is cultivated, and produces excellent wine.

The Albanian shore, between Dubovica point and cape Linguetta, nearly 110 miles to the southward, is elevated and bordered by a continuation of the high lands of Dalmatia, as far as the neighborhood of Dulcigno, where it becomes lower; thence to Bojana river is a flat country. Between the Bojana and St. Giovanni di Medua it is slightly raised and has the appearance of a wall; inland of St. Giovanni di Medua is a vast sandy plain intersected by marshes and bounded by mountains. To the southward of St. Giovanni di Medua the high lands in the interior disappear, excepting in the vicinity of Durazzo and to the S. of cape Linguetta.

Almost the whole coast of Albania is composed of sandy bays, interrupted occasionally by elevated, steep, rocky points of land. Between the entrance of the gulf of Cattaro and Dulcigno, the soundings are generally deep; but between Dulcigno and Valona bay to the southward the water is much shoaler, and the bottom is affected considerably during the heavy rains and when the rivers are full; attention should therefore be given to the lead when in proximity to this part of the coast. The productions of the soil are wine, corn, oil in small quantities, and tobacco of good quality.

**GULF of CATTARO**—or *Bocche di Cattaro*—affords excellent anchorage, but in a sailing vessel it is often difficult and ever dangerous of access and exit during about four months in the year, but it is second to few ports in the Mediterranean for a fleet of large steamships. It is about 16 miles in extent, E. and W., and consists of four basins,

viz; *Topla*, *Teodo*, and *Risano* bays and gulf of *Cattaro*. These basins being surrounded by high land, the greatest precautions are necessary, particularly in selecting an eligible berth for anchoring, owing to the suddenness and violence of the squalls which rush down from the elevated valleys both on the N. and the E. sides; but on the whole they may be considered, not including the entrance, to afford good anchorages, with sufficient depth of water for vessels of the largest draught. Near the center of the basins the bottom is generally mud, which nearer the shores is mixed with sand and shells. Vessels are warned not to anchor in the vicinity of the telegraph cables. The numerous villages and detached houses on either side, and the cultivation extending up the base of the lofty mountains, the summits of which appear almost overhead, afford extreme interest, the latter being magnificently grand.

**Making the Land.**—On sighting the land to enter the gulf, mounts Radostak and Lovcen or Sella, which surround the gulf, are excellent guides in clear weather, when they may be seen at a great distance. But in southeasterly and southwesterly winds they are generally obscured, and are not visible till sufficiently near for the low parts of the land to be seen. The southernmost mount, Lovcen or Sella, is, on approaching the coast from any quarter, conspicuous, and, as its name implies, is saddle-shaped.

In nearing the gulf the white light-house on point d'Ostro is conspicuous, and together with the fort just below it, the fort on Mamula islet, which is 50 feet high, and the small round fort on Arza point on the E. side, makes the entrance easily distinguishable. On the NW. side of the light-house is a semaphore building painted in horizontal white and black bands, by means of which vessels can communicate by the International code of signals. It is connected with the electric telegraph wires of the continent.

**Winds.**—The land wind in the gulf of Cattaro often lasts till late, so that, on nearing point d'Ostro, a vessel may lose even a fresh SE. breeze; it is not prudent for a sailing vessel to close the land before 10 a. m. or after 3 p. m. It is necessary to be prepared for the bora, which even in fine weather often comes on suddenly with extreme violence. In the winter it is always difficult to distinguish the land about the entrance to the gulf in SE., southerly, and southwesterly winds; indeed, in a vessel under sail, it is then sometimes impracticable to enter.

**Current.**—The currents are rapid and uncertain in the Cattaro passages, especially in the entrance; after heavy rains they attain a speed of two to more than three miles an hour, and at other times about half this rate; in the summer there is little current.

**LIGHT.**—The light-house on the summit of point d'Ostro, on the W. side of entrance, exhibits at 263 feet above the sea a *fixed* white light, varied by a *flash* every *half minute*, and visible in clear weather from a distance of 20 miles.

**The Entrance** is about  $1\frac{1}{2}$  miles wide, the shores of which are inaccessible, rocky, and covered with brushwood. It is so exposed to winds and heavy seas from the southward, that it is not prudent to anchor unless necessitated by calms or currents. Mamula islet, with a fort on it, a long half mile W. of Arza point, is clear of danger and may be passed on either side. If obliged to anchor in the entrance, care must be taken to avoid a rocky bank with eight fathoms water on it, about a third of a mile SW.  $\frac{1}{4}$  S. from the fort on Lustizza point; also, the electric cable between the light-house and Lustizza point.

In the summer season it is advisable in a sailing vessel to keep on the eastern side, to avoid the frequent calms near Kobilá point, and where the anchor may be dropped if unable to stem the current. This is also a better position to meet the heavy squalls which, when it rains in the mountains, become more easterly than the regular breeze. Care should be taken to avoid being set by the current into the bay on the NW. side of entrance, where there is often a heavy sea, and the holding ground is bad. Vessels will find temporary anchorage sheltered from the eastward in port Zanjca, the bay E. of Mamula islet, but to secure for a bora cables should be taken to the shore. On the N. side of Arza, the S. point of the bay, is a large rock with some ruins on it.

**LIGHT.**—A *fixed red* light is shown from a stone tower 12 feet high in the center of fort Mamula, which is built on Rondoni rock, at the entrance to the gulf of Cattaro. The light is dioptric, visible from a distance of four miles, and elevated 111 feet above the level of the sea.

**Topla Bay.**—The western basin affords anchorage in its NW. part, in six or seven fathoms, mud, about three-quarters of a mile from the shore at the head of the bay, and a long half mile off Castelnuovo mole. It is easily reached, but greatly exposed to sea winds, and it is not a good anchorage, even in the fine season. At the head of the bay are extensive marshes into which the river Suttarina discharges, and the remains of salt pits.

The shore all round the head of the bay is bordered by shoal water, which extends off nearly half a mile.

Like the entrance, it is surrounded by barren high land of whitish aspect. Generally, if care be taken to enter the gulf without a good breeze, the western basin may be easily reached. Between Kobilá and Lustizza points, at the inner part of the entrance, the inner and outer currents meet, and with southerly winds there is often a heavy



sea. Sailing vessels should not attempt the passage without the prospect of carrying with them a good breeze. The electric cables run between Lustizza point and Castelnovo.

**Caution** is particularly required during the last three months of the year, and in January when southerly winds prevail; even when these winds do not reach the entrance they often send in a sea, aggravated by the current, which, in the winter season, at times runs here at the rate of more than three miles an hour.

**Anchorage.**—The best anchorage in the western basin is that of Melinje on the northern coast, about  $1\frac{1}{2}$  miles eastward of the town of Castelnovo. Vessels anchor here and small craft make fast to the shore, being well protected from sea winds; and as the bottom rises considerably there is no risk of being driven ashore by them, although S. and SE. winds occasion a considerable sea. This anchorage is safe from SE., NW., and W. winds; the last seldom blow longer than 24 hours. Caution should be observed with reference to the bora, as by carrying away the in-shore cable the other anchor might drag, the bottom being shelving.

**Castelnovo** is a small town with about 8,000 inhabitants, and to the NE. of the entrance. It is commanded by fort Spagnuolo, on a hill 509 feet high. The land in the neighborhood on the N. shore is well cultivated, and provisions may be obtained. There is a watering place near the lazaretto. The coast between Castelnovo and the lazaretto is exposed to sea winds, and the anchorage off it is not good.

**LIGHTS.**—A *fixed red* light is shown from Castelnovo new mole, visible two miles. Also, two *fixed red vertical* lights; the one 21 feet and the other 30 feet above the sea are shown from the lazaretto at Melinje, and visible four miles.

**Port Rose** is a cove at about a mile within Lustizza point, and opposite Castelnovo. It is less than 300 yards across the entrance, and has a depth of six fathoms, muddy bottom. It is well known to the native mariners as the first place of shelter from southerly winds, and they often anchor here, it being a convenient position for a start outward with the land-breeze.

**Teodo Bay.**—The middle basin is in the form of a triangle, with sides extending four miles in length. It is land-locked and well sheltered from bora gales. Entry is easy in the season of northwesterly winds. In the winter it is difficult, if not impossible of access to a sailing-vessel, not only on account of southerly winds, but owing to the strength of the current, which makes it useless to attempt to beat through the Kombur channel. Westerly winds are of little avail, as they seldom retain any strength in the gulf of Cattaro. The land on

the S. side is high, and almost the only dwellings are at the entrance of Kartole bay. On the NW. coast the ground is low, well cultivated, and abounding in country houses, under the shelter of mount Devesile, which rises 2,582 feet above the sea. The NE. coast is similar to that of the NW., and is sheltered by the high lands of mount Vermac.

**Kombur Channel** is about 800 yards wide. Vessels should avoid closing the northern shore after passing Kombur, as the shore is bordered by shoal water with about  $1\frac{1}{2}$  fathoms on it.

**Kartole Bay**, in the SE. part of the basin, is formed by Otok, Stradioti and St. Trinita islets, which extend from the shore in a NW. direction; the first named of these islets is the westernmost and smallest; the second is the largest, and covered with bushes; the third is between the SE. end of Stradioti and the shore, and has a chapel on it. The E. side of Teodo bay affords good anchorage in 10 to 15 fathoms, mud; in SE. winds, the water is quite smooth; the inclination of the bottom is favorable to holding on, in winds from the opposite direction.

Kartole bay, on the SW. side of the islets, and which is about 600 yards wide, affords the best anchorage in the middle basin for vessels of moderate size, in SE. and NW. winds, and even in the bora, as owing to its distance from the high land the heavy squalls from the valleys are comparatively little felt.

Caution must be used to avoid too close an approach to the eastern shore, from Seljano bay southward, as it is bordered by shoal water. A reef, in places nearly awash, extends 1,200 yards to the NW. from Stradioti islet, which should be carefully avoided.

**The EASTERN BASIN** is larger than the middle one, and consists of the gulf Cattaro on the E. and S., and Risano bay on the W. and N. Although there is good holding ground in nearly every part of this basin, it is not often resorted to, owing to the difficulty of access under sail, but a considerable number of native vessels winter in its various corners.

The land squalls are heavier here than in the other basins; the high land rising abruptly from near the coast. The SE. wind is also dangerous, particularly under the northern shore, which it reaches in extremely violent sudden gusts. Northerly winds, though squally, never blow here in great strength.

**Le Catene.**—The channel of Le Catene, leading to the eastern basin, is about  $1\frac{1}{2}$  miles in length, and less than 400 yards wide at the narrowest, or NE. part. At the entrance, after passing St. Domenica point, a vessel should keep on the W. side, to avoid a shoal with three feet water on it, a little within the point on the opposite side; otherwise the

water is deep. In entering the eastern basin two currents, one from Cattaro side, the other from Risano bay, at times cause a race which requires a three-knot breeze in a sailing vessel to pass through. The points of Le Catene in the gulf of Cattaro are connected by electric cable.

**LIGHTS.**—A *fixed red* light is exhibited at St. Domenica point, on the W. side of entrance to Catene channel; also a *fixed green* light at the inner end and W. side of the channel. These lights are shown from wooden stands.

**Risano Bay.**—Two small islets surrounded by shoal water, and each of which has a chapel on it, lie in the route to this bay, leaving a passage with deep water on either side of them, of which the western is the wider.

The small town of Risano—ancient *Rhizenium*—is in the N. corner of the bay. The inhabitants are given to commercial pursuits. The land in the vicinity is well cultivated, as is also the opposite shore. The coast between, westward, is sterile and almost uninhabited. The town of Perasti is immediately opposite Le Catene channel, and commanded by a fort.

It is connected to Stolivo on the S., by electric cable.

**LIGHT.**—A *fixed red* light, 13 feet above the sea, is shown from an iron standard on the mole head at Risano, during dark nights and when steamers are expected.

**Water.**—A cascade, called Sopot by the natives, issues from a cavern near the town. Water is also abundant in Morinjo river opposite Risano, and along the shore of Perasti; at a rivulet close to the small town of Orahovac, and the whole of the eastern basin is plentifully supplied by the high lands which surround it.

**Cattaro Town**, containing about 4,500 inhabitants, is at the S. extreme of the bay, at the foot of a rocky hill, the summit of which is separated by a wide valley from the steep mountain range of Montenegro. It is surrounded by an old wall, and protected by batteries, chiefly by the castle on the summit of the hill. It is about  $2\frac{3}{4}$  miles northwestward of mount Lovcen or Sella (Saddle), the highest of the surrounding mountains, which reaches 5,770 feet above the sea. Stolivo and Percanjo villages lie at the foot of mount Vermac and are surrounded by gardens. The inhabitants are all mariners, as are the natives of the gulf generally.

The frontier of Montenegro is close to Cattaro, and the Austrians have carried up to it, by numerous zigzags, an admirably constructed military road. Cettigni, the capital of the principality, is distant a ride of six hours. The market held outside the eastern gate of Cattaro is

frequented by the Montenegrins, whose rich dress and silver-mounted arms are much admired. Fresh beef is very inferior at Cattaro.

It would be prudent for large vessels arriving off the town of Cattaro to moor; a fair berth will be in 11 fathoms, mud bottom, with St. Elia point N.  $39^{\circ} 36'$  E. distant about 400 yards, and the powder magazine N.  $38^{\circ} 24'$  W.

The water off the town is fresh, and a vessel's bottom, however foul, will soon become clear. There are two white mooring buoys in deep water, to which vessels of war are occasionally permitted to make fast. The Austrian Lloyd's steamers run alongside the marina to discharge passengers and merchandise. Vessels are not permitted to anchor abreast the powder magazine, which is a long low building with a blue slated roof, in the small bay between Glarati point and Mula, on the W.

**LIGHT.**—A light is shown from the E. bank on the N. side of Cattaro, visible two miles. It is *red* between SW.  $\frac{3}{4}$  W. around by S. and E. to NE.  $\frac{3}{4}$  E., and white in the rest of the circle.

**DIRECTIONS.**—When bound to the gulf of Cattaro, it will be advisable to make the land from the southward on account of the currents, and to steer for mount Sella to insure a good position for entering. If the land should be made when steering at right angles to the coast, mount Radostak, 4,779 feet high, and rising about six miles N. by E.  $\frac{3}{4}$  E. of point d'Ostro, will also be a good mark for the entrance.

When prevented by unfavorable winds from entering the gulf, small vessels anchor, especially in the favorable season, on any convenient parts of the coast, close to; but excepting for momentary purposes or in urgent cases, it is better to repair to Traste bay.

If outward bound and having passed Kobila point, the wind should be southeasterly with a heavy sea, and the current running, which, when opposed by that from the gulf, sets towards the bay in the NW. part of the entrance, the vessel should anchor immediately. She would then be in an exposed position, but would thus incur less risk than in attempting to proceed, or in endeavoring to return to an inner anchorage unless having a sufficiently favorable breeze to permit stemming the outgoing current.

If the land wind should be lost before rounding point d'Ostro, it would perhaps be necessary to anchor, for it would be impracticable to beat out against the coast current and sea-breeze.

After passing point d'Ostro, if the vessel should be becalmed before having obtained a sufficient offing, she would be in danger of becoming embayed on the coast between the point and Ragusa Vecchia. Care should therefore be used to take advantage of the land winds which occur at all seasons, and to procure a sufficient offing before they are

overcome by the sea-breeze. It will thus be seen that on leaving the gulf in a sailing vessel during the winter, the rapidity of the currents often present serious and sometimes dangerous obstacles.

**TRASTE BAY** is about five miles to the SE. of the entrance to the gulf of Cattaro, the coast between being steep and irregular, and clear of off-lying dangers.

Remo point, two miles from the NW. point of the bay, is of whitish aspect, and Zukovac point nearly the same distance SE. of the bay is high and abrupt. Its position will be readily distinguished, being formed by the low ground joining the hilly peninsula of, and southward of the middle basin of Cattaro, with the land southeastward, rising from Traste point to mount Percia Glava, 1,362 feet above the sea, about  $2\frac{1}{2}$  miles from it.

Traste bay is  $1\frac{1}{2}$  miles wide at the entrance, and falls back about the same distance, with from eight to 16 fathoms water, sand and shells; but there is a rocky patch with six fathoms on it, lying nearly half a mile ENE.  $\frac{1}{4}$  E. of the N. point of entrance, which should be avoided in the event of a vessel seeking temporary anchorage here. The bay is completely open to the southward, but in the SE. corner, within Traste point there is good anchorage in eight or nine fathoms, sheltered from the bora and all winds. There is a church and some houses here, and some forts on the hills around the bay.

On entering the bay, a wide berth should be given to Traste point, as it runs off shoal in a northwesterly direction; near the extremity of which is a white conical buoy, in  $3\frac{1}{2}$  fathoms water, about 160 yards from the point.

**Albanese Rock** lies about S. by E.  $\frac{3}{4}$  E. two miles from Traste point, and NW.  $\frac{1}{4}$  N. less than 800 yards from Zukovac point; the rock is awash, and it should have a wide berth.

**Coast.**—If overtaken by a bora gale near the coast between Zukovac and Platamone points, the best spot for anchoring is close to the shore, off a conical hillock, upon the summit of which is St. Elia chapel. But on the cessation of the bora, or the slightest indication of a southerly wind, which is often preceded by a heavy swell, vessels should get immediately under way. Steep well-wooded hills rise between the two points, and the water is all along deep.

Between Platamone point and Budua,  $2\frac{3}{4}$  miles to the eastward, are the bays of Tersteno and Jasi; the latter affords shelter, during moderate weather, in easterly and northeasterly winds, but as it is open to the southward, a vessel should leave on any indication of wind from that quarter. The shore of the bay is bordered by shoal water.

Mount Spas rises a short half mile from the shore of Jasi bay, 1,228

feet high, and at a distance seaward has the appearance of an island. It is of pyramidal shape, the steepest side being on the NW., and on its summit is a monastery; it terminates in Jasi point, which separates Jasi bay from Budua.

Between Budua and Dubovica point, about eight miles to the SE., the coast is of rather bold approach, excepting a few rocks here and there skirting the shore.

**PORT BUDUA.**—Between Platamone point and Pavlovici,  $6\frac{1}{2}$  miles to the southeastward, the coast falls back and forms a bay more than  $2\frac{1}{2}$  miles deep. On the N. shore of the bay is the little walled town of Budua, situated on a small sandy peninsula. The islet of St. Nicolo, about a mile long, nearly a quarter of a mile broad, and 335 feet high, lies with its length in a SSE.  $\frac{3}{4}$  E. direction from the town. Its N. end, which is distant from the town 900 yards, is connected with it by a shoal or ridge, having only  $1\frac{1}{2}$  to three fathoms water on it.

Another shallow rocky ridge projects from the same point of the islet in a N. by E.  $\frac{1}{4}$  E. direction, nearly reaching the shore, but leaving a very narrow passage with  $3\frac{1}{2}$  fathoms water, into port Budua, a small area with  $3\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, sand, shells, and mud, sheltered by the islet and receiving considerable protection from the shallow ridges. The deepest passage to the port is between St. Nicolo islet and Zavala, a protecting point in Malaluka bay NE. of it, but it would not be prudent to enter in a strong SE. breeze. The SW. side of St. Nicolo islet is clifty, and rocks extend off nearly 400 yards.

A buoy with double cone and skeleton ball painted white, lies in 17 feet water, on the shoulder of the ridge extending from Budua towards St. Nicolo islet. In entering the port pass near the buoy and leave it on the port hand.

**LIGHTS.**—A small mole projects from the NE. part of the town of Budua, from which is shown a *fixed red* light visible two miles.

A *fixed* white dioptric light is exhibited from an iron standard on the SE. point of St. Nicolo island. The light is elevated 66 feet above the level of the sea and 10 feet above the ground and is visible eight miles, over an arc of  $270^\circ$ , between the bearings N.  $85^\circ$  E. and S.  $5^\circ$  E.

**Maluka Bay**, between St. Nicolo islet and the shoal ridges on the W., and the coast on the E., affords a clear space of about  $1\frac{1}{2}$  miles square, with nine to 16 fathoms, good holding ground. During summer large vessels may anchor here in case of emergency, for though sheltered from W. N. and E. it is exposed to southerly winds and sea.

St. Stefano is a small village on a little rocky peninsula, E.  $\frac{3}{4}$  S.  $1\frac{1}{2}$  miles from the S. point of St. Nicolo islet.

Near the shore, between St. Stefano and Dubovica point, may be seen

houses and some cultivated patches; the higher grounds are covered with trees.

**St. Domenica and Katic Rocks.**—At rather more than a mile southward of St. Stefano is Gossa point, rounded and 215 feet high; and  $2\frac{3}{4}$  miles farther on is Lastua Castle and a telegraph station. To the S. of the castle are the two islets or rocks of St. Domenica and Katic; the former and nearest the shore is 108 feet high, and has the ruins of a monastery on it; the latter islet is 112 feet high.

The inner rock is less than a third of a mile from the coast, and there is a narrow pass with six fathoms water, between the reef surrounding the islets and the shallow water bordering the shore. The reef extends nearly a quarter of a mile southward of the islets and is steep-to. The coast of Dalmatia terminates about three miles to the SE. of Lastua castle.

**Spizza Bay.**—At nearly  $5\frac{1}{2}$  miles to the SE. of Lastua castle is Cerniert point, the NW. extreme of Spizza bay; the point is steep-to, bold, and 508 feet high. At about  $1\frac{1}{2}$  miles to the eastward of the point is a battery on elevated land, and just beyond it the village of Spizza. There is anchorage in this bay for small vessels with off-shore winds, in nine fathoms, sand, half way between the village and Ratec point on the S., but it is otherwise completely exposed. At a little more than a mile eastward from the shore of this bay, mount Pettilje rises 2,350 feet above the sea.

**ANTIVARI ROADS.**—Following Spizza bay on the S., the shore forms an inward curve round the base of mount Pettilje, the first part being rocky and then beach, and terminating in Volovica point, which projects to the NW., forming a bay called Antivari roads. On the high land over the bay, and below mounts Pettilje and Gorni Gora, is fort Susana, 1,023 feet above the sea. On Volovica point is a battery of seven guns, and in the rear of it a white house; shoal water extends off 200 yards from the point.

Vessels in entering the roads should not approach the point too closely, and may anchor in eight or nine fathoms, mud, good holding ground, with the light or house bearing SW.  $\frac{1}{4}$  W. distant half a mile. As Antivari roads are entirely open from the westward, vessels must be prepared to take every precaution on the usual indications of adverse weather.

This part of the coast is backed by high mountainous land, and the peaks of mounts Kosa, Rumia, and Lissin rise respectively, from about  $2\frac{1}{2}$  to  $4\frac{1}{2}$  miles inland, to 3,728 feet, 5,226 feet, and 4,528 feet above the sea.

The town of Antivari, ancient *Antibarum*, is built on a hillock, in the

form of an amphitheater, and is about two miles inland. It is fortified and surrounded by a wall. It is said to owe its name to its position *opposite Bari*, on the Italian coast. Antivari is in communication with Scutari by electric telegraph. Between the towns is a very indifferent road which takes 10 hours to traverse on horseback; it is wholly impracticable for any kind of vehicle.

**Winds.**—In the winter it does not blow hard from the NW., and the anchorage is sheltered from all off-shore winds and as far round as about SW. by W. In winter, the strongest winds are off the mountains; in summer there are hard squalls from the NW. with thunder and lightning, but they are soon over.

**LIGHT.**—On Volovica point, on the S. side of entrance to Antivari roads, from a standard 24 feet high, is exhibited, at 131 feet above the sea, a *fixed* white light, visible 10 miles.

**The COAST** between Antivari roads and Menders point, about nine miles to the southward, forms an indentation where a vessel may anchor, if able to reach it when overtaken by a bora gale, but the shore must be approached, to arrive at a moderate depth of water. The coast line is irregular, with two or three small bays the projecting points of which are foul, and off the N. point of Kruci bay, is a little islet and some rocks.

Noce bay, on the N. side of Menders point, has room near the custom house for a few small vessels in northeasterly and easterly winds. The land rises immediately over the N. side of this bay to a height of 1,447 feet.

**DULCIGNO ROAD.**—This is a completely open anchorage, in 10 to 12 fathoms, off the walled town of Dulcigno, ancient *Oleinium*, which is in the form of an amphitheater, and being upon rather elevated land, forms a good mark seaward at a distance of 12 or 13 miles. Dulcigno has two high square turrets and five minarets, of which the highest is near the landing place. Dulcigno is six hours from Scutari, the road is fair, and horses may be obtained.

The soil in the vicinity is extremely arid, but in the spring beautiful varieties of flowering shrubs fill the air with delicious perfumes.

**The Coast** between Menders and Derana points, a distance of about five miles to the SE., is about 500 feet high, when it diminishes rapidly in height until in the vicinity of port St. Giovanni di Medua. There is anchorage all along this part of the coast from Dulcigno eastward, during land winds and the bora.

**Guri Garranis Rock**, nearly four miles southeastward of Dulcigno, lies at rather more than three-quarters of a mile from the shore, with eight fathoms inside of it; it is 15 feet high, of a light reddish color, with a sunken rock outside it, and 10 and 11 fathoms water near it.



**BOJANA RIVER** has its source in Scutari lake, and runs into the sea at about eight miles southeastward of Dulcigno. The least water in the channel across the bar in June, 1881, was  $4\frac{1}{2}$  feet, which depth probably represents the greatest draught that could enter the river with safety. The channel is liable to shift.

Having crossed the bar, the ascent of the river presents no difficulties to the ordinary steam cutter of a ship of war, and no pilot is required until close to the town of Scutari. But later in the summer, when the water is low, it is stated that the navigation becomes difficult, and is scarcely possible except by means of the flat canoes which are locally known as londras.

In the spring and autumn the river overflows its banks, but in June it is from 100 to 150 yards in width, with deep water close to the shore, except at the concave sides of its numerous bends.

The time occupied by a steam-cutter in the ascent to the town of Scutari is about 8h, including 2h. at anchor; the descent occupies 2h. 25m. The distance of Scutari from the bar, as determined by patent log, is 23 miles; the current varies in strength from  $2\frac{1}{2}$  miles an hour in the lower part of the river to  $3\frac{1}{2}$  miles in the upper part.

The village of San Giorgio, which marks the Montenegrin boundary, is on the right bank of the river, about  $7\frac{1}{2}$  miles from the entrance, and about half a mile below the entrance of Brin river, which flows into the Bojana from lake Sas.

At the village of Oboti, six miles below Scutari, large two-masted vessels anchor, and this is apparently the highest point to which sea-going vessels ascend, although there is in the month of June sufficient water all the way to Scutari for any vessel that could pass the bar. The traffic above Oboti is carried on by londras.

Fish, fruit, and poultry appear to be plentiful.

The navigation of lake Scutari, except when it is much flooded, is reported to be easy, there being no dangers which are not visible.

The country is thickly settled between the mouth of the river and Scutari, to a distance of 11 or 12 miles on either side.

The town of *Scutari*, ancient Scodia, called by the Turks Iscu lar, is the capital of the province of Albania, and the residence of the governor. It is on the slope of a hillock, crowned by a fort about three miles from the SE. end of the lake. It is in communication, by telegraph with Durazzo, Valona, Otranto, and Corfu.

Vessels should be careful to give the entrance of the river a wide berth, as a sand bank with three feet water on it extends nearly three-quarters of a mile from the shore. The bank is formed by the stream from the river, but shifts from time to time in southeasterly gales.

The mouth of the river will be known by a white two-storied house, a guard-house, and a small chapel. The land here is low, well wooded, and extends perfectly level for some miles inland to the base of the mountains.

The long spit which runs out from the beach on the W. side of entrance affords shelter from the surf to boats entering.

**Bojana Anchorage.**—There is excellent anchorage off the river Bojana with all off-shore winds, and a steam vessel with fair power and with moderate attention would be able to put to sea almost in any weather. A good summer berth is in six or seven fathoms water, a long mile from the shore with a white house on the E. side of entrance bearing N. by E.  $\frac{1}{2}$  E.; or in a large ship, half a mile farther out in nine or 10 fathoms. There is no pratique office here, and it is difficult to procure native boats to communicate with the shore.

**Scutari Lake.**—This lake is nearly 20 miles long, and from two to nearly four miles broad, and is in the middle of a fertile, well-populated plain. It receives the waters of the Moracca and of several other rivers which flow from Montenegro and the mountains eastward. It has an abundance of fish; large boats are employed on it.

**The GULF OF DRIN** is formed between Menders point on the N. and the narrow promontory of cape Rodoni on the S., and from a line between the two the gulf is about 12 miles deep. It affords good anchorage all along its shores with off-shore winds and in the bora, which blows here with great violence. Care should be taken to keep the lead going when approaching the shore of the gulf, as it is bordered all round by shoal water, which extends some distance off, especially at the mouth of the several rivers.

This gulf is the ancient *Apollonia*, the scene of Cæsar's narrow escape with his fleet. In addition to the Bojana, the Drin, the Matja, and the Jschmi some minor streams empty into the gulf.

**Port St. Giovanni di Medua.**—In the NE. part of the gulf, and where the land is high, is the little port of St. Giovanni di Medua, affording sheltered accommodation for about a dozen small vessels in  $3\frac{1}{2}$  to four fathoms water, secured to the shore. The port is about a third of a mile deep to the N., and is protected by a shoal bank projecting from its W. side, which covers it from the S., and is steep-to.

There is little to indicate the position of the port, until a vessel has approached close to it. It will be known by the only spur of the neighboring ridge of hills, whose base is washed by the sea. The rocky shore is about a mile in length, and its eastern extreme forms the W. side of the port; with this exception, the sandy beach runs for miles to the westward and to the southward of it.

Anchorage will be found with the W. point of the port bearing NNE.  $\frac{1}{4}$  E. distant  $1\frac{1}{2}$  miles, and the same distance from the E. shore, in 11 or 12 fathoms, sand and mud, and though exposed to the SW., it is said to be safe, as a gale from this quarter is unknown, and it is well sheltered from the bora and sirocco.

St. Giovanni is the most unhealthful port in Albania during the summer months, but the malaria and fever cease by the middle of October. It is said that few escape who visit it during August and September, however short a stay they may make, and the appearance of the people and country tend to confirm this opinion.

It is nearly eight hours from Scutari, viz;  $1\frac{1}{2}$  to two hours from Alessio, where horses may be obtained, thence six hours to Scutari. A messenger to Scutari returns on the second day.

Cargo for Scutari is discharged into vessels of light draught at St. Giovanni di Medua, for Hobotti on the Bojana, eight miles from Scutari, and thence up the river by boats. A light steamer runs occasionally to Hobotti.

In anchoring elsewhere in the gulf of Drin, the best place is in Rodoni roads, on the N. side of the promontory; here a vessel will be sheltered from the SW., in 12 to 14 fathoms water, with the cape bearing W.  $\frac{3}{4}$  S. or W.  $\frac{1}{2}$  S. distant  $2\frac{1}{4}$  miles, and one or  $1\frac{1}{4}$  miles from the shore of the promontory. Small vessels may go farther in. There is anchorage, with mud bottom, all over the gulf in northerly and easterly winds.

**Drin River**, the largest of the four rivers excepting Bojana, above mentioned, is navigable by boats as far as Alessio, ancient *Lissus*, a small town on a hillock in a fertile plain on the eastern bank. From Alessio there is a fair road to Scutari, and this is said to be the best place to communicate with this latter town.

**CAPE RODONI**.—The promontory which terminates in cape Rodoni is narrow, elevated 500 to 675 feet above the sea, steep and bare near the extremity, inside of which it is covered with vegetation and trees. It stands up conspicuously from the low adjoining ground on the N. and S., stretching out about five miles to the northwestward, and is a good guide. The cape is bordered on either side by shoal water, which extends about  $1\frac{1}{2}$  miles to the NW. of the cape, which should therefore have a berth of about two miles in rounding, and attention paid to the lead.

**Cape Pali** is nearly 11 miles to the southward of cape Rodoni; the low shore between is a sandy beach, and forms rather a deep bay, named Lales, with seven to 13 fathoms between the two points, and shoal water all round the shore of the bay, especially in the southern part, where it extends off two miles. The indentation on the NE. side of the

cape is called cape Pali roads, but from the shallowness of the water it affords shelter, from the SW., to small craft only. The river Arcen runs into the sea, about  $3\frac{1}{2}$  miles to the NE. of cape Pali; other streams empty near here, and within the beach about midway is a large lake. In the NE. part of the bay temporary anchorage may be obtained from a bora gale, the soundings being between four and seven fathoms, mud bottom, at from one to two miles from the shore.

Cape Pali, which is hillocky, and covered with trees, juts out about two miles in a northwesterly direction, the extremity being rather lower than near the middle; shallow rocky bottom extends a long way to the NW. from the cape, and it should have a berth of at least a mile in passing, and attention given to the lead.

**DURAZZO BAY** is formed between capes Durazzo and Laghi, which are nearly 10 miles apart; the former cape is a high, round sugar-loaf hill; the latter, to the southward, is of little elevation, projects but a short distance, is covered with brushwood, and has a church on its summit. These capes form the only exceptions to the lowness of the shore on this part of the coast, which is bordered all round with shallow water, extending a long distance off, and in southwesterly and westerly winds, when the weather is thick, it is difficult to make out the land about the bay, in which there are numerous off-lying shoals, and from 25 to 30 fathoms water, not more than three miles outside the dangers.

The coast from cape Pali southward rises to upwards of 600 feet, at about  $1\frac{1}{2}$  miles from cape Durazzo, and within it is the large lake of the same name. It is bordered by a rocky bank, which in places is some distance from the shore, and in continuation of it the Durazzo bank, with less than two feet water on it, terminates in  $4\frac{1}{2}$  fathoms, at  $1\frac{1}{2}$  miles southward of the cape.

Separated from the tail of Durazzo bank by a space of about 300 yards, with six fathoms water, is the Talbot shoal, which, within the limit of the depth of five fathoms, is about half a mile in extent N. and S., and on its northern part there are only two fathoms water.

The anchorage is inside these banks eastward of a line S. from the E. end of the town, and as far N. as convenient, avoiding the shoals fronting the town. Westerly and southwesterly winds send in a considerable sea.

The town of Durazzo—ancient *Dyrrachium*—lies partly on a slope of mount Durazzo and partly in a pretty valley to the S. of it. It is a fortified and walled town, and was the emporium of the commerce of the Romans with Greece; to this day it is the chief center of trade in

Albania, and as many as 20 or 30 small vessels are here at the same time.

Population about 7,000. It is the seat of Catholic and Greek archbishops. There are rich mines of coal in the vicinity of Durazzo, which have not been fully explored.

The Kawaja and Dartsch rivers empty into the S. part of the bay.

**LIGHT.**—A *fixed* light is shown from near the quay at the SE. angle of Durazzo, at an elevation of 52 feet above the sea. The light between the bearing of ENE.  $\frac{3}{4}$  E. and NE.  $\frac{1}{2}$  E. is white; between NE.  $\frac{1}{2}$  E. and N.  $\frac{1}{2}$  W. it is *red*; and between N.  $\frac{1}{2}$  W. and WNW. white. The white light is visible eight miles and the red five miles.

**Directions.**—In approaching Durazzo anchorage, a white, rocky hillock, 336 feet high (Sasso Bianca), on the E. shore of the bay, and which is a good guide for identifying the bay in the offing, should be brought to bear E.  $\frac{3}{4}$  N. and a course steered for it until the SE. extreme of the town of Durazzo bears N.  $\frac{1}{4}$  W. The Talbot shoal will then have been passed, and a course may be steered for the right of the town, and a berth taken up as convenient or according to the vessel's draught of water. When cape Laghi is obscured, and Sasso Bianca not seen, it will not be prudent to steer for the anchorage.

In entering the bay at night a vessel should not approach the light nearer than three miles, until having passed from the *red* to the white light, and bearing westward of N.  $\frac{3}{4}$  W.; then steer for the anchorage. The lead should on all occasions be kept going.

**Selada Banks.**—From cape Laghi, for a distance of four miles to the northward, and more than  $2\frac{1}{2}$  miles from the shore of the southern part of Durazzo bay, the whole space is shoal and dotted with rocky patches, with as little as two and nine feet of water on them. The outer chain of these dangers runs nearly N. from cape Laghi and the Selada banks, with a depth of  $1\frac{1}{2}$  fathoms, is  $3\frac{1}{2}$  miles from the cape, with the church on the brow of the hill near Barbant point, bearing SE.  $\frac{3}{4}$  E. southerly; and Robit hill, 180 feet high, a short half mile in from the beach ENE.  $\frac{1}{3}$  E.

These banks should not be approached into a less depth than 25 fathoms, and at night, when Durazzo light is seen, it should be kept eastward of a NE. by E.  $\frac{3}{4}$  E. bearing, until assured of being to the northward of them.

**COAST.**—From cape Laghi to cape Treporti, about 43 miles to the southward, there are no remarkable objects by which positions may be identified. The shore is one uninterrupted sandy beach, with numerous small sand-hillocks, and behind it is a vast desert plain, intersected by marshes and extensive lakes as far as the hills in the interior. The

coast affords no shelter, and it is bordered all along by shoal water, the five-fathom line of soundings being in places nearly two miles from the shore.

In the above distance three rivers empty into the sea: the Sbumki,  $6\frac{1}{2}$  miles southward of cape Laghi; the Semeni,  $15\frac{1}{2}$  miles farther on, having its source in mount Tomor, and after an irregular course through the plain, its outlet has formed a low, dangerous point, projecting about three miles beyond the line of coast; the Vojuzza, whose source is at the foot of mount Pindo, reaches the sea at about  $7\frac{1}{2}$  miles N. of cape Treporti.

As the alluvium deposit around the mouths of these rivers has caused the water to be shoal some distance off, care should be taken when in their vicinity.

Cape Treporti, which is the northern limit of Valona bay, is not a prominent point, but being a mixture of rocks and earthy matter 204 feet high, it forms some contrast with the general aspect of this low, sandy part of the Albanian coast. It is skirted by rocks, which extend off about 150 yards, and from the Vojuzza, the five-fathom line of soundings passes two miles from the coast to one mile from the cape.

**LIGHT.**—At the extremity of Samana point, near Semeni river entrance, two *fixed* white lights placed *vertically* are exhibited; the *upper* light is elevated 52 feet above the sea, and should be visible in clear weather from a distance of 10 miles.

**SASENO ISLAND**, which lies off the entrance of Valona bay, is  $2\frac{1}{2}$  miles in length, steep-sided, and 1,087 feet high; the summit is formed by two dark conical hillocks, which at a distance give it the appearance of two islands. It is uninhabited, excepting occasionally by shepherds, who find pasture for their flocks.

Between Saseno and cape Treporti the depth is 17 fathoms at half a mile from the island, and six fathoms at a little more than a mile from the cape. There is temporary anchorage off St. Nicolo bay, on the NE. side of the island; the holding ground is excellent, but the shelter seaward is good from southerly and westerly winds only.

**LIGHT.**—On the NW. part of Saseno island is a light-house which exhibits, at 328 feet above the sea, a white light showing a *flash* every *minute*, and visible from a distance of 21 miles.

This light will not be seen from vessels bound northward from Corfu channel until it is open of cape Linguetta and bearing eastward of N.

**VALONA BAY.**—This spacious bay is comprised between capes Treporti and Linguetta. For some distance southward of the former is a low, sandy shore; farther S. the coast is backed by hills of moderate elevation. The S. extreme of the bay is low, and contains a lake,

in the vicinity of which the ground is marshy. The SW. side is high and almost precipitous, the land rising 2,750 feet above the sea, which terminates northward in cape Linguetta. Its position near the entrance of the Adriatic gives importance to the bay as a place for vessels to make for, if overtaken by a SW. gale on entering, or by southeasterly or easterly winds on leaving this sea.

Vessels visiting the bay in the summer for a short stay generally anchor between the skala or landing place and the light-house, in 10 to 13 fathoms, mud and weed. Northwestern winds send a heavy sea into this anchorage, and the bora is severely felt.

Vessels intending to remain for a longer period should proceed to port Dukati at the head of the bay, where there is shelter from all winds. An indentation in the SW. side of the bay, called Raguseo cove, is well sheltered on all sides, with 10 to 12 fathoms water.

The town of Valona—ancient *Aulon*—is at the foot of a cultivated hill a long mile from the skala, and is defended by two forts or castles. The hillocks southeastward, on one of which is the castle of Kanina, are thickly covered with olive trees. It was formerly populous, but now contains about 5,500 inhabitants. There is little trade. Salt is the chief produce. The arms formerly manufactured here were held in high esteem.

Two small streams, one on the W. side of the bay, and the Nisvora at its head, afford facilities for watering.

**LIGHT.**—On Pelasgia point,  $1\frac{1}{2}$  miles southward of the skala, is a white house, from which is exhibited, at an elevation of 82 feet above the sea, a *fixed red* light, visible five miles.

**Directions.**—Cape Linguetta and Saseno island are easily recognized, especially the former, which is a continuation from the southward of the coast range of mountains, and at about two miles from its termination is 2,367 feet high.

When making the land from the NW. quarter, a course should be steered for the high mountains, which are covered with perpetual snow, until Saseno is seen, when steer for the island. In passing the Vojuzza river and cape Treporti, the coast should not be closely approached, on account of the shoal water which borders it, and the lead should be kept going. The current here sets to the northward.

The southern passage between cape Linguetta and the island, is safe, but in proceeding thereby to the bay it should be borne in mind that the current sets through it to the NE., but it is not very rapid except in SE. winds, when it is advisable to keep rather upon the Linguetta side. During these winds a good lookout must be kept for violent squalls from the high lands in the neighborhood.

## CHAPTER XIII.

### COAST OF ALBANIA.—CORFU AND ITS ADJACENT ISLANDS.

VARIATION in 1883:

Cape Linguetta  $8^{\circ} 09'$  W.  
Prevesa  $7^{\circ} 49'$  W.

Cape Bianco Corfu,  $8^{\circ} 04'$  W.

This chapter contains the description of the coast of the province of Epirus, being that part of Albania beginning where the coast approaches nearest to that of Italy, and between which is the entrance of the Adriatic. The seaboard southward from cape Linguetta to the gulf of Prevesa is in a straight line about 115 miles. It generally presents to the eye a beautiful aspect, lofty ranges of mountains and hills being separated by fertile valleys and plains. There are but few villages on the coast, and a scanty population.

**Winds.**—During summer northwesterly winds are the most prevalent, but in winter those from the southeastward. In settled weather in summer, when the barometer is high, and often in winter, land and sea-breezes prevail. The land wind blows from the mountains through the valleys and reaches a longer or shorter distance from the coast according to the season, occasionally but very rarely to 20 miles, though usually not beyond 10 miles. This wind is light, and in Epirus blows from N. to NE.; in the gulfs of Patras and Corinth from NE. to E.; on the coast of Arcadia from N. to NE.; and on the S. coast of Morea out of the gulfs.

It commences to blow two or three hours after sunset, and increases in force until after midnight, when it decreases and falls calm at sunrise, freshens again with the rising of the sun and veering some points eastward until about 9h. a. m., after which it becomes calm and is succeeded by the sea-breeze.

The *imbatto* or sea-breeze sets in between WSW. and NW. generally at about 10h. a. m., and at times an hour or two earlier, but rarely so late as noon. It increases in strength in the first two or three hours, attaining its maximum up to 3h. p. m., when it blows fresh, and then gradually decreases in force and dies away an hour or two after sunset. This alternate land and sea-breeze renders the climate of Ionia healthful, and the sea-breeze becomes refreshing during the hours of the greatest heat.



The prevailing wind in summer, which blows from the westward between WSW. and NW., belongs to that atmospheric column which, entering the strait of Gibraltar, continues through the whole length of the Mediterranean to Palestine; it is general during the months of July and August with a clear sky (dry in Greece), and varies in direction during the 24 hours, veering to the southward of its normal course during the forenoon, and by degrees to the northward, where it is steady during the night. When bound westward advantage should be taken to profit by this changing of the wind.

This wind during the August moon, and at times, also, during that of July, gives place to the dry sirocco, a moderate wind without rain, which blowing from Africa at this season completely gains the ascendancy and renders the dog days almost insupportable. This sirocco is more from the E. during the morning, more to the S. in the afternoon, and at times during the night veers to the SW., when in the day time its force is always greater than at night.

In the summer there are at times passing storms but of short duration, perhaps lasting a couple of hours; they are very violent and in the inner channels they are foretold by large black clouds which gather in the interior of the valleys of the islands, and burst in dangerous squalls over the narrow seas, accompanied by rain or hail so heavy as to shut out all view of the neighboring land. Should the sky therefore be threatening, with slight oscillations of the barometer, caution will be necessary. At night the approach of a fresh breeze will be heard.

As in winter during two or three days, so also in summer for 24 hours, a strong breeze from the NW. blows in the eastern part of the Ionian sea; it is called the *Tarantata* because it comes from the gulf of Taranto. These strong winds or gales are of such force that vessels have to bear-up before them. The sirocco or SE. wind predominates in November and December, and after an interval of a month again sets in in February and March. It is preceded by the falling of the barometer, by a mild, close atmosphere, objects appearing above their natural position, less wind, and dark clouds on the summits of the land. It sets in with heavy clouds, a thick atmosphere, rain, and much sea.

Vessels outside the Ionian islands and bound to the Adriatic should close the islands during the day so as to ascertain their position. Sailing vessels bound to the southeastward should give the islands a berth of about 50 miles, tacking off and on at about that distance.

The sirocco each year partially blows during an entire lunation, and, after a brief period of calm, blows again with its usual force for another 14 days.

While in the Adriatic and Archipelago in winter, with ordinary

weather, the winds are from the northeastward; at the same time in the Ionian sea the mountains are covered with snow, and at times the plains at their base, where it remains for several days, the atmosphere being thick and the cold intense, and the weather stormy at the entrance of the Archipelago, with a heavy sea to the southward of Cerigo.

**Currents.**—A general current sets from the Archipelago and along the coast of Greece towards and into the Adriatic; in settled weather its rate is about three-quarters of a mile an hour, though in the channels of the Ionian islands, from local causes, there may be a divergence from this rule. The strength of the flood and ebb is felt at the entrance of the gulf of Arta, and that of Corinth, where the velocity is at times three miles an hour. The current decreases in strength in proportion to the distance from the land, increases in velocity with southeasterly winds, and still more with strong westerly winds, when a mass of water from the Mediterranean sea becomes heaped up on the coast of Syria, and finds its level in the general current.

**Mountains.**—The high mountains of Albania and Greece are visible from seaward at a great distance, and when coming from the westward there is no position whence, in fine weather, land cannot be sighted at a distance of more than 50 miles from the coast. The mountains of Cika, in Albania, are seen when SW. of cape Santa Maria di Leucà before the cape itself can be distinguished. Mount Nero, the highest mountain in Cephalonia, is also visible at a distance of 80 miles, and is usually the first land sighted from the westward. Vessels on a more southern parallel will sight mount St. Elias or Makryno, rising 7,900 feet above the sea, about seven miles from the eastern shore of the gulf of Kalamata.

The aspect of the country, as viewed from the Ionian sea on a clear day, is very imposing; the mountains in all variety of forms, pyramidal, cut and scarped in a greater or less degree, with bold slopes and well-defined outline, alters in appearance with every change of position.

The high mountains of Candia or Crete will be seen from the SW., and nearly always covered with snow.

**Caution.**—As the buoys marking the shoals in the Ionian sea are often out of their positions, and at times gone altogether, and the lights very defective from imperfect illumination, navigators are cautioned to be on their guard when in these waters.

**CAPE LINGUETTA** (Glossa or the Tongue) is the NW. termination of an elevated peninsula, which projects nine miles from the high coast range of mountains on the S., and forms the western side of Valona bay, and a prominent headland on the eastern coast at the entrance of the Adriatic.

**The Coast** from cape Linguetta to port Palermo, a distance of 32 miles, is almost inaccessible and generally precipitous. It is the sea front of a high range of serrated mountains which culminate in mount Cika, 6,644 feet above the sea, three miles inland, on the parallel of about  $40^{\circ} 12' N$ . Along this extent of coast there are only two or three little coves, with no shelter whatever, and it is, and has ever been, looked upon with dread, of becoming a lee shore, as a southwesterly gale blows directly on to the land, although the current almost constantly sets to the NW.

**Strade Bianche** is a remarkably conspicuous white watercourse, or that of a great torrent, the sandy bed of which descending from the Cika mountains at a steep inclination, presents the appearance many miles off, of a broad white path, hence the name. It is an excellent landmark.

It approaches the sea about three miles to the SW. of mount Cika, the most elevated peak of the range, which with Kiore, another high peak close to it to the NW., are visible in clear weather from a distance of 75 miles.

**Port Palermo**—ancient *Panormus*—is a bay formed on the W. side of a high ridge of land which projects southward for more than half a mile, and slopes gradually towards its extreme; it is sheltered on the SE. side by an elevated peninsula, and is open to the SW.

The bay is divided into two parts by a projecting point, upon which is a triangular castle, with a few houses in the rear. The real port is on the W. side, has 15 to 35 fathoms, muddy bottom, and is sheltered against all but southwesterly winds; on the E. side, called Kaka bay, there is rather less depth. The prevailing wind should be considered in the choice of one of these anchorages; the shelter is good, but the bottom deepens so rapidly towards the entrance of the bay that anchors often drag in the bora, which frequently blows here in the winter. The bottom is rocky in various parts of the bay.

There is no difficulty in distinguishing Palermo. Its position, with reference to Corfu and to Merlera island, and the high land on which stands fort Borsi or Bhars, overlooking St. Demetrio church, are ample indications. Near the fort is a town containing about 400 houses, and a minaret surrounded by a ruined wall; its inhabitants are mostly Turks. The shore on the E. side of the entrance should not be closely approached, as it is skirted by one or two rocks awash.

**Supplies.**—Beef and mutton may be readily obtained, but vessels seldom touch here except in cases of necessity; the inhabitants, who were formerly much addicted to piracy, are still, it is said, to be greatly mistrusted. It is through this port that the produce of the high lands

is exported; olives, maize, gall-nuts, and wood are exchanged, chiefly for arms.

**Cape Kiephali.**—To the eastward of port Palermo is Grava or St. Demetrio bay, with the little church of the latter name, overlooked by the ruins of fort Borsi. Cape Kiephali, distant nearly 11 miles to the SSE. of port Palermo, is a round projecting headland, 489 feet high, covered with stunted trees and bushes, and steep-to. There is nothing remarkable about the coast between, which falls back, forming an indentation about two miles deep. The water is all along deep at a short half mile off, and it is backed by high, mountainous land.

**Santa Quaranta Bay**, about five miles to the SE. of cape Kiephali, is sheltered from all but westerly winds, to which it is quite open; it is capacious and fit for vessels of any size. Large vessels anchor near the middle, in 17 to 15 fathoms, mud and sand, and small craft find shelter to the northward nearly abreast of some dwellings not far from the custom-house, which is near the beach, and the ruins of an extensive fortress. The village of Lykursi on a high conical hill is very conspicuous.

A rocky shoal about a third of a mile in length E. and W., with from one to two fathoms water on it, lies nearly a quarter of a mile off the N. point of the bay and is steep-to.

A smaller shoal exists in the northern part of the bay well under the land; it is not dangerous to navigation, being so near the shore.

Santa Quaranta has regular postal communication with Janina, and with Corfu by the Austrian Lloyd's steamers which call here.

**Directions.**—Cape Kiephali is a guide to the position of Santa Quaranta bay. Vessels keeping near the N. point of the bay, in a northerly wind, should avoid the rocky shoal which lies off it. Small vessels drawing under six feet, pass between the shoal and the point, keeping close to the latter.

**Coast.**—From Santa Quaranta bay, the coast which is generally rocky and bold, trends southward, and at the distance of about three miles is the monastery of St. Giorgio, standing on a pleasant looking hill, 354 feet high. The monastery is at the NW. angle of Butrinto lake, which is separated from the sea by an irregular piece of land from about a third to  $2\frac{1}{2}$  miles in breadth. At  $1\frac{1}{2}$  miles farther on the coast forms a bay, in the S. part of which are the four small islets of Tetranisi. Vessels occasionally anchor on the S. side of these islets, in nine or 10 fathoms water, sand.

**CAPE SCALA** is about  $1\frac{1}{2}$  miles to the SW. of the Tetranisi islets, and the land between, which is about 500 feet high, forms with the opposite coast of Corfu, the narrowest part of the N. channel of Corfu.

From here the town of Corfu, with its magnificent surrounding panorama, will be seen.

**Butrinto Bay** to the SW. of cape Scala, is about a mile wide, and falls back nearly three-quarters of a mile to a low broken shore. There is anchorage in the center of the bay, in 14 to 16 fathoms, stiff clay, with cape Scala in line with the E. extreme of Corfu bearing NNW.  $\frac{1}{2}$  W., and a square tower on an elevated spur open to the N. of the ruined fort of Votemi, in the middle of a marsh NE.  $\frac{3}{4}$  E. This is considered the best anchorage along the coast, but care should be taken not to approach the shore too close, as the water shoals suddenly from 12 fathoms. The eastern extreme of Corfu should be kept in sight or open of cape Scala, to avoid the mud bank of Butrinto river; this bank extends some distance off shore all round the bay, and is formed principally by the deposit brought down the Katito river.

**Butrinto Lake.**—This fine sheet of water is  $3\frac{1}{2}$  miles in length, and about  $1\frac{1}{2}$  miles in breadth, with depths of 10 and 12 fathoms all over it; the N. and S. shores are marshy, but the E. and W. rise in thickly-wooded limestone hills, and from the N. end an extensive wooded plain, extends to the foot of the high mountain range near Santa Quaranta. The lake abounds with fish, and towards the northern part the water is fresh; it communicates with the sea by the Butrinto river at the SW. corner.

Another small lake of fresh water, named Risa, to the SE., communicates with Butrinto lake by a narrow canal, and is supplied by copious springs.

After entering the Butrinto river, on the N. is the salt-water lake Almura, which is entered by a narrow channel opposite fort Votemi, which is in ruins. The river here is about 20 yards wide, and at  $1\frac{1}{2}$  miles farther up on the northern bank is the ruin of an extensive fort, with several square towers standing on the summit of a rocky peak. An abundance of game is found in the neighborhood.

**CAPE STILO**, four miles S. of cape Scala, is low and sailent; but the land about two miles within it rises to 885 feet; the coast between Butrinto bay and the cape is high, with deep water close-to. The islet of Stilo, about 400 yards in circumference, and 270 feet high, lies about 200 yards from the shore southward of the cape, with four fathoms water between.

Port Ftelia, a short mile eastward of Stilo islet, is an irregular inlet, open to the S., and about 600 yards wide at the entrance. An islet lies on its western side, and within it on the N. there are three to seven fathoms water; to the eastward of the islet there are 11 fathoms water. Small country vessels occasionally seek shelter here, and either anchor

to the N. of the islet, or in the long creek to the eastward, in nine or 10 fathoms.

**Kotarto Shoal.**—This rocky shoal, 600 yards in diameter, with three fathoms water on it, and 26 to 34 fathoms around it, lies nearly three-quarters of a mile from the shore,  $2\frac{3}{4}$  miles eastward of Stilo islet, and  $1\frac{1}{2}$  miles from the S. point of entrance to port Paganía. The remarkable cone, 377 feet high, on the coast  $1\frac{1}{2}$  miles to the SE. of the S. extreme of Paganía peninsula, kept open bearing ESE.  $\frac{1}{2}$  E., leads S. of the shoal.

**Port Paganía.**—This little port is five miles to the ESE.  $\frac{3}{4}$  E. of cape Stilo; the port is formed by a small peninsula, 270 feet high, projecting at a right angle, and then trending parallel to the coast, the sea face of this latter part being about  $1\frac{1}{2}$  miles in length. The entrance is open to the westward, 550 yards wide, with 27 fathoms water in mid-channel; the port runs in about 1,200 yards and then trends nearly 800 yards to the southward; this inner part is land-locked, upwards of 200 yards wide, but narrows close up to the head, and has from three to five fathoms water, and  $1\frac{1}{2}$  to one fathom in the narrow part at the head. It is little frequented, there being no fresh water, and no village. Vessels anchoring here should run hawsers to the shore, as the bottom, although mud, is not good.

**Hilda Bay.**—On the E. side of Paganía peninsula the coast forms a semicircular bay open to the S., nearly three-quarters of mile deep, and the same width. On the W. side of the bay are the two little Hilda islets. There are 14 to 17 fathoms water in the bay, and it is occasionally visited by small vessels.

**Sajada Bay.**—A mile to the SE. of Hilda bay is a point terminating in a remarkable sugar-loaf cone, and the northern limit of Sajada bay which is open to the SW. The southern limit of the bay is near the mouth of the N. branch of the Kalamo river, which enters the sea N. of mount Mavronoros, a remarkable forked mountain, with its northern summit 1,675 feet high, and which rises within less than a mile from the sea. The bay is circular, about two miles wide, with its northern coast high, and the southeastern low; the northern shore is bordered by a bank which increases in breadth round the SE. side of the bay, where the shoal ground extending northward considerably contracts the area of deep water, the five-fathom line of soundings being only about  $1\frac{1}{2}$  miles from the N. point. The village of Sajada is at the foot of the hill at the NE. angle of the bay. In entering keep on the northern shore, and anchor as convenient in 12 to four fathoms, mud, with the custom-house at the scala bearing E.  $\frac{1}{4}$  N.

**Supplies.**—Excellent water in any quantity may be obtained from a copious spring, which runs into the sea a mile W. of the scala or landing

place. Fresh meat can be had in small quantities, but no vegetables. Trade is very limited.

**Bacchante Flats.**—The river Kalamo (ancient *Thyamis*) empties by two mouths; separating about two miles inland, one branch runs into the sea N. of mount Mavronoros, and the other by an irregular course round its base to the southward. The shoal bank bordering the low shore of Sajada bay, continues southward fronting the mouths of the Kalamo and the base of mount Mavronoros, terminating at port Livitazza, of which it forms the northern boundary; it extends into the Corfu channel  $2\frac{1}{2}$  miles from the shore under mount Mavronoros, and has evidently been formed by the mud and débris brought down by the Kalamo, and is called Bacchante flats; the edge of these flats is steep-to; the water shoaling from 14 to two fathoms. The white houses of Murzo village kept open of Prasudi island, bearing SE. by S., leads westward of the flats.

**Port Livitazza.**—The wooded peninsula of this name, to the SE. of the Kalamo, is  $1\frac{1}{2}$  miles in extent E. and W., 285 feet high, and united to the mainland by a narrow sandy neck. Its N. side forms with the shallow coast bank S. of the Kalamo, the port of Livitazza, which is open to the W. and runs in about a mile. The entrance and the interior appear large, as the N. shore is low and forms a deep bight to the N., but the channel, which is circumscribed by the shoal water, is along by the high land of the peninsula and carries from seven to 11 fathoms water, and should be entered with discretion.

A vessel may anchor in from 11 to nine fathoms, good holding ground. The port has three bays; the second affords the best anchorage, which is in the center, in eight fathoms mud, and land-locked. Small craft load with firewood in the third or inner bay. A large extent of swampy ground exists on the N. and E., with two arid hills, preventing communication with the interior.

There is a great scarcity of fresh water, the river Kalamo being brackish for a considerable distance from its mouth.

**Prasudi Island.**—This island is green, being covered with vegetation, oval in form, about 800 yards in extent, and 100 feet high. It lies two-thirds of a mile westward of the S. extreme of Livitazza peninsula, and is a guide for the navigation of the Corfu channel, and a mark for clearing the Bacchante flats. A sunken rock lies close to its SW. side, but elsewhere it is nearly steep-to; between it and the peninsula there is a reef of rocks above water.

**Port Gomenizza.**—Following Livitazza peninsula, the coast to the SE. forms a fine sandy bay, where the Turkish fleet formerly used to anchor in seven or eight fathoms, sand. In continuation of the neck of

sand uniting Livitazza peninsula with the mainland, the low sandy shore trends eastward to a tongue projecting 1,400 yards to the southward and terminating in Drepano point,  $2\frac{3}{4}$  miles eastward of Prasudi island, and which forms the N. point of entrance to port Gomenizza. At 1,400 yards to the SW. of Drepano point is the islet of Ajonisi, 74 feet high, close to the termination of a promontory of high land (1,100 feet), which projects two miles to the NW.; at a long half mile within the islet is cape Kudromurto, a wooded bluff and the N. extreme of the promontory. The entrance into port Gomenizza is between the above islet and cape on the S. and Drepano point on the N.; the two latter being 900 yards apart.

Within the entrance, the port opens out into nearly an oval basin about  $2\frac{1}{2}$  miles in a NNW.  $\frac{3}{4}$  W. and SSE.  $\frac{3}{4}$  E. direction, and  $1\frac{1}{2}$  miles wide. A large portion of the northern part is shoal, but the eastern and southern parts have from 12 to 14 fathoms water, over a level mud bottom; but the shoal water which predominates in the northern portion of the port surrounds Drepano point and unites with Ajonisi islet on the S., forming a sandy bar with only  $2\frac{1}{2}$  fathoms, the deepest water.

To cross the bar, bring an isolated pinnacle peak 1,871 feet high, about  $4\frac{1}{2}$  miles inland from Ajonisi islet, in line with cape Kudromurto bearing about E. by S., which will lead over the bar; then keep along by cape Kudromurto and the point within it, and anchor off the custom-house in nine or 10 fathoms, mud. The village of Grava and custom-house are on the eastern shore; a fortress in ruins stands on a hill in the rear, and to the SE. is a fine cultivated plain.

A few bullocks and sheep may be purchased, and small quantities of fresh water can be obtained from a well.

**Plataria Bay.**—This bay, on the S. side of Ajonisi promontory, extends in nearly  $3\frac{1}{2}$  miles to the village and low shore of the plain of the same name at its head. Its shores are rocky, but a fine cultivated valley extends to the SE. between bold precipitous ridges; the bay is open to the westward, and the water deep, but two rocky patches lie in the center near its head, having five and three fathoms water on them, the former rather more than one mile, the latter three-quarters of a mile from the beach, with deep water around them. Hieronisi islet, 115 feet high, is the S. point of entrance to the bay, and nearly connected to the extremity of the high land, the base of which forms the S. side of the bay. It is seldom resorted to as an anchorage, and subject to heavy squalls during southerly gales. The distance between this islet and that of Ajonisi on the N. is  $2\frac{1}{2}$  miles.

**Sivota Island** is a mile in length NW. and SE., rocky, 384 feet high, thickly wooded, and lies  $6\frac{1}{2}$  miles southward of Prasuda island; it forms



with the coast of cape Bianco the entrance of the south channel of Corfu, which is four miles wide. This island from its dark color is conspicuous and an important object in the navigation of the channel, especially at night, and the water is deep at half a mile from it.

**Port Murzo.**—Between Sivota and the mainland is the small island of San Nicolo, which is 237 feet high, with its S. point united to Sivota by a reef of rocks. San Nicolo is separated from the coast by a channel from 400 to 600 yards wide, and 1,400 yards in length, which forms the snug little port of Murzo; the custom-house will be seen on the shore to the southeastward. At the entrance of the port there are 20 fathoms water, which diminishes rapidly within; the passage to the S. is winding, and between Murzo and the point to the SE. on one side, and the two islands of Sivota and San Nicolo on the other, there are only two fathoms water. Small vessels which visit this port anchor in four fathoms water, near the Aga or commandant's house, with hawsers to the shore.

**Supplies.**—Water can be obtained from a fine spring near the village, and provisions are cheap. The Turks have a depot for coal in the little channel which separates San Nicolo island from the mainland.

**Coast.**—At about 11 miles to the SE. of Sivota island is cape Keladio, the W. point of port Parga; the coast between rises in high rugged ridges partially wooded, the shore being rocky, with a few small sandy bays, clear of danger and the water all along deep at the distance of half a mile; it is backed by high mountainous land which at a mile within cape Varlam is 1,656 feet high. As the coast at night may become obscure a good lookout should be kept.

At less than a mile to the SE. of Sivota island, is a semicircular bay, 1,200 yards wide and open to the S.; the E. point is a projection from the coast; there are sunken rocks around it, and a rock above water in the bay, inside of which there are 14 fathoms water. At about  $1\frac{3}{4}$  miles beyond the above bay is that of Arpizze, a small indentation in the land with two islets or rocks close to the coast, one N. of the bay, the other S., and about three-quarters of a mile apart. Thence a mile farther S. is Arilla bay and beach, open to the W.; between these two last bays is a large isolated mountain 1,104 feet above the sea; the village of Arilla stands on the S. side of this mountain.

At a long mile from Arilla is a small bay with the little river Paramythia running into it, but which is of no importance; and about  $1\frac{3}{4}$  miles farther on is an islet or rock 100 yards from the shore on a narrow bank which borders the coast in this vicinity; the islet is to the N. of cape Varlam, the curve of the steep coast, and not at all salient. From this islet to cape Keladio the coast is bold, steep-to, and the distance  $4\frac{1}{2}$  miles.

**Parga** (ancient *Toryne*) is a town containing about 5,000 inhabitants, which, with its citadel and fortifications, stands on a conical rocky height 263 feet above the sea; the citadel is in front of the town, and was formerly considered almost impregnable, but is now fast falling into ruins; it commands an extensive view. The streets of the town are narrow and dirty, and the houses straggling. The adjacent country is fertile, and produces an abundance of tobacco, fruit, the olive and the vine.

The little port of Parga is divided into two bays by the projection on which the citadel stands; the larger, to the W. of the citadel, is semi-circular, with a sandy beach at its head, it is about 600 yards wide and 600 yards deep, with six to seven fathoms water in the middle, and open to the southward. The anchorage is in seven fathoms, mud, at about 250 yards to the SW. of the shore of the citadel.

The other bay to the SE. of the citadel is considered the port of Parga, and is protected from the sea by a chain of islets and rocks extending from St. Anastasio point, which has a chapel on it. This bay is nearly 200 yards wide at the entrance and 500 yards deep, with five to eight fathoms water, sandy bottom, and open to the SW. These bays are fit only for small vessels, and coasting vessels usually anchor in the eastern. One of the bays was anciently called "the port of Sweet Waters;" afterwards port Velike. The lazaretto is on one of the islets.

**Cape Keladio**, the W. point of port Parga, is steep and rugged, 173 feet high, and has on it a conspicuous square tower, being part of the ruins of a convent. On the W. side of the point is an islet or rock, and on the E. side, at about 200 yards from the shore, is a rocky ledge awash.

The entrance to port Parga is between this rocky ledge and the chain of islets and rocks extending from St. Anastasio point, on the W., and the distance is 500 yards across. During fine weather in summer, vessels will find temporary anchorage in 21 fathoms water, mud bottom, 600 yards from the shore of the citadel, with cape Keladio bearing WNW.  $\frac{3}{4}$  W.

At  $1\frac{1}{2}$  miles to the ESE.  $\frac{3}{4}$  E. of cape Keladio is the islet of St. Nicolo, 50 feet high, with a white chapel on its summit; it lies 400 yards from the shore, and in the space between there are 22 fathoms water. At  $2\frac{1}{2}$  miles eastward of St. Nicolo is the port of San Giovanni.

**Port St. Giovanni** (ancient *Acherusia*), is a bay about 1,400 yards N. and S., 1,000 yards wide, with from 19 fathoms water at the entrance to six fathoms near the head, and open to the S. It is surrounded by high limestone hills, and its northeastern shore is skirted by rocks, but its sides all round may be closed to about 200 yards. Small vessels anchor in eight or nine fathoms, off Skuluki cove, which is in the NW.

corner of the port, and in which they moor, but the best anchorage is in 13 fathoms, mud, in the middle of the bay, but only with northerly winds.

Within the W. point of the port, and off the first cove, rising from a depth of 12 fathoms, is a remarkable spring of fresh water, formerly named Thucydides; on the eastern shore, near a cultivated patch of ground, excellent water may be obtained.

**Port Phanari** (ancient *Glycys*).—At two miles to the southward of port St. Giovanni is the entrance to port Phanari, the coast between being high red rocky cliffs and free from danger. The entrance to port Phanari is less than 300 yards wide, and exposed to the SW.; the interior opens out to the N., is circular, and 800 to 1,000 yards in diameter; but this expanse of water is deceptive, as a large portion of the port is silted up by the alluvium from the river Gurla, nearly the whole of the port westward from the sandy shore which borders it being shallow, the deep water extending only 300 yards from the W. side of the port, and which becomes again shallow to the N. The village of Phanari is on the eastern shore.

The N. point of entrance is 50 feet high, and its sea face for nearly half a mile northward is skirted by sunken rocks; also, a rock six feet above water lies 500 yards from the S. extreme of the point, and about 100 yards from the shore; and another, a large gray rock, is close to the shore, about 200 yards from the point. The S. point is a tongue of land projecting to the N. 75 feet high, with a chapel on its summit. The position of the port will also be known by the ruins of the castle on a hill,  $2\frac{1}{2}$  miles inland to the eastward, and by the cliffs on either hand which are wedged shaped.

The anchorage is about 300 yards northward of the N. point of entrance, and a short 200 yards from the western shore, in  $5\frac{1}{2}$  fathoms water; country vessels winter here, by anchoring on the above shore, and hauling in close to the rocks. There is also temporary anchorage in fine weather during summer, 600 yards to the SW. of the entrance to the port, in 10 fathoms; the depth outside this increases rapidly.

The river Gurla, ancient *Acheron*, runs into the SE. part of the port, and is a considerable stream; it has only two feet water on the bar, but boats can ascend some distance, and drinking water may be obtained from it. The Vouvo, ancient *Cocytus*, joins the Gurla about  $2\frac{1}{2}$  miles from its mouth.

A current of about  $1\frac{1}{2}$  miles an hour generally runs out of port Phanari, which is much stronger during the rainy season.

**Coast.**—The valley in the interior is well cultivated, and visible some distance, the land on its SE. rising to mount Zarothema, 3,000

feet above the sea, at 7 miles from Phanari. The coast for some distance S. of the port is rocky, followed by sandy beaches separated by small points. At  $8\frac{1}{2}$  miles to the SE. of Phanari, are the picturesque ruins of the castle of Riniassa 535 feet above the sea, perched on a limestone rock; the castle has apparently been destroyed by an earthquake splitting the entire hill in twain, leaving a deep perpendicular chasm dividing the fortress longitudinally. At three miles farther on is the bluff point of Kastrosikia, with the town of the same name a long half mile to the N. of it. The shore all along from two miles S. of Phanari, is bordered by a bank having from one to four fathoms water on it, at the distance of a quarter to three-quarters of a mile from shore.

**Kastrosikia Point** is a slightly projecting low red bluff, the termination of the southern slope of mount Zarothema, with a beach on either side, and forms the N. extreme of Gomaros bay. The point is surrounded, at the distance of about three-quarters of a mile, by a rocky shoal, which terminates to the SW. in Ittisa reef, with about four feet water on it. At three-quarters of a mile NW. of the point, and half a mile from the shore, is a rock awash. As the rocky shoals surrounding Kastrosikia point are steep-to, it should have a wide berth, as the soundings are irregular, and there are nine and 10 fathoms water, close to the reefs.

**Gomaros Bay** is formed between Kastrosikia point and Mytika bluff,  $6\frac{1}{2}$  miles to the SSE.  $\frac{3}{4}$  E.; within this line the bay is  $1\frac{1}{2}$  miles deep, the shore all along is a sandy beach, through which several streams of fresh water run into the sea, with a chain of hills a mile inland; near the middle is a village, and over the southern part of the bay is mount Mikalitzza, 520 feet high, with a building on its summit, and below it to the SW. are the vestiges of an ancient mole projecting 400 yards from the shore. To the S. of mount Mikalitzza the Romans made a canal to unite the Ambracius Sinus with the Ionian sea; and the ruins of the ancient Nicopolis are scattered on the ground.

The bay affords anchorage with off-shore winds, northward of mount Mikalitzza, in 10 or 11 fathoms water, at half a mile from the shore; the depth farther off increases rapidly. From about a mile N. of the ancient mole, the beach southward to Mytika bluff is bordered by a bank with five fathoms water, which extends off nearly a mile.

Small coasting vessels load with the produce of the country in the N. corner of the bay, where there is a custom-house, sheltered from the westward by the Ittisa reef.

**Mytika Bluff**, the S. extreme of Gomaros bay, forms with the shore a little cove on the N., near the village of the same name. At 600 yards

to the N. of the bluff, and rather more than this distance from the beach, is a rock awash. Mytika bluff is clifty, surrounded by shallow rocky ground, and at three-quarters of a mile westward there are only  $3\frac{1}{2}$  fathoms water; and the bank steep-to.

Between the bluff and fort Pantakratora on the N. side of entrance to Prevesa strait,  $3\frac{1}{2}$  miles to the SE., the land is thickly covered with olive trees; the coast is clifty, with sandy beach, and skirted by a continuous chain of rocks, which extend half a mile off the bluff, but a less distance to the southward. The whole of this part of the coast between the parallel of mount Mikalitza and Prevesa strait should have a wide berth, and attention given to the lead when near it.

**CORFU** (ancient *Corcyra*), the most important of the Ionian islands, may be considered the key of the Adriatic sea. It is about 32 miles in length NW. and SE., with an irregular coast line, the northern portion of the island being  $15\frac{1}{2}$  miles in breadth E. and W., but at seven miles from its northern extreme it suddenly contracts to less than six miles, S. of the town of Corfu to about five miles, and at the head of Lefkimo bay six miles from its SE. extreme to two miles, and its area is about 200 square nautical miles.

In general, the island is mountainous, and covered throughout with olive plantations. Mount St. Salvador (*Istone* of the ancients, and *Pantokrator* of the Greeks), the most elevated part of the northern ridge, forms two remarkable conical peaks 3,000 feet above the sea, with flat table land between them; its sides are precipitous, thickly wooded, and cut up with deep ravines and water-courses. On the W. side of the island and farther S., mount St. Giorgio rises 1,288 feet high, close to the sea, and beyond it mount Santa Decca 1,859 feet.

The population is about 100,000. The principal exports are oil, olives, and salt; it produces excellent fruit and vegetables, and a small quantity of corn and wine, but of the two latter not sufficient for the inhabitants, the deficiency being supplied from Egypt and the neighboring islands. Provisions of all kinds are easily obtained.

The number of vessels which enter and clear yearly is about 890, amounting to 594,000 tons; and the value of the exports 78,440*l*.

There is a weekly communication with almost all parts of the Mediterranean by means of the Austrian, Italian, and Greek steamers.

**CAPE SANTA KATERINA**, the N. point of Corfu, is somewhat low, but easily distinguished by the church on its summit, about 200 feet high. It bears SSW.  $\frac{1}{2}$  W.  $5\frac{1}{2}$  miles from cape Kiephali of Epirus, between which is the entrance to the north channel of Corfu.

**Aprau Bay**.—At rather less than  $1\frac{1}{2}$  miles to the southeastward of cape Santa Katerina, is Spiridione point, and between, the water is shoal

nearly half a mile off. Following Spiridione point,  $2\frac{1}{2}$  miles farther on, is Cassopo point, on which are the ruins of a fine Venetian fortress; the intermediate coast forms the bay of Aprau, where there is anchorage, with off-shore winds, in 11 to 19 fathoms water. On the SW. side of Cassopo point is the little port of Cassopetto, with four fathoms water. These places are seldom used except by fishermen.

**Bolana Bay.**—After passing Cassopo point, a mile to the SE. is Barbary point, and between is Bolana bay, oval in form, 800 yards wide and 1,200 yards deep, with from eight to 15 fathoms water. This bay affords shelter from southerly winds, but is seldom used except by fishermen.

**TIGNOSO ISLET.**—This islet lies E. by N. about two-thirds of a mile from Barbary point; it resembles a number of whitish stones irregularly placed, one upon another, crowned by a circular white light-house and a few small trees.

At 400 yards N. of Tignoso is a small rock above water, and the two are united by a tongue of shallow ground.

At nearly half a mile to the eastward of Tignoso, is a small rock only a few feet above water, steep-to, called Barchetta (small boat). There are 19 fathoms between the islet and rock.

At about 400 yards to the N. of Barchetta is a sunken rock with only six feet water on it.

To the eastward of the Barchetta, and westward of Tignoso, the channels are clear.

**LIGHT.**—The light-house on Tignoso islet exhibits, at an elevation of 100 feet above the level of the sea, a *fixed* white light, and should be seen in clear weather from a distance of 14 miles.

**Serpa Rocks.**—From Barbara point, the coast trends to the SE. a long mile to San Stefano point, which is moderately high, as is also the extreme of Corfu; N. of the point are some sunken rocks near the shore. At half a mile to the SW. of San Stefano point, upon a hill 395 feet high, are the ruins of a mill.

The Serpa rocks, which are just awash, lie about a third of a mile from the S. point of the little bay or cove under the mill. These rocks are steep-to, having deep water on their E. side, and contract the channel between them and the coast of Albania, to one mile in breadth. In calm weather they are seen by their reddish color in contrast with the blue water. Vessels at night should keep well over on the Butrinto shore.

**Port San Stefano** is a small bay to the southward of the mill, open to the S., with about  $2\frac{1}{2}$  fathoms water in the middle; it is fit only for small coasters.

Port Karagol is another small bay open to the eastward, with a little mole and a chapel near it, fit for boats.

**Ipsos Bay.**—From Karagol point, which is  $1\frac{1}{2}$  miles southward of San Stefano point, the coast trends to the WSW. along the base of the steep craggy slopes of mount St. Salvador, and is bold and steep-to; at five miles from the former point is Ipsos bay, where the shore trends S. and eastward to the town of Corfu. Vessels occasionally anchor in Ipsos bay in seven to 10 fathoms, mud. The land is thickly covered with olive trees.

**Port Govino.**—About three miles to the NW. of the town of Corfu is the well-sheltered port of Govino, a mile deep, but narrow, owing to the accumulation of mud on both shores. It is surrounded by marshes which cause fevers, and in consequence is now seldom used as a port. Here the Venetians had their arsenal, the ruins of which are still visible along the western shore. It has a depth of four to  $4\frac{1}{2}$  fathoms, but the mud, which contracts the deep water, surrounds both points of entrance.

Comeni head, a small round promontory 130 feet high, with an islet on its S. side, is about two miles southward of Ipsos bay, and on the N. side of entrance to the port.

**Corfu Town,** on the E. side of the island, and picturesquely standing on a promontory projecting to the eastward, and washed on either side by the sea, is of considerable strength. On the eastern part is the citadel, separated by a ditch or fosse with seven or eight feet water, which is built on a rugged precipitous rock, with its summit split into two peaks, each crowned by a strong battery, on the western or highest of which is a light-house and signal station.

The town is surrounded by strong fortifications; fort Neuf, built by the Venetians, forms the NW. extreme. On the E. face of the town is the Government house, and a fine esplanade, laid out with walks and avenues of trees, and commanding a magnificent view. The streets of the town are narrow but clean; there are several churches, a theater and hotels. The Sanità, or health-office, and custom-house are on the N. face of the town. In the ditch on the W. side of the citadel is a landing place, whence a flight of steps leads up to the esplanade; on the N. face is a camber, in which small vessels lie in six feet water; a gate at its SE. angle leads to the citadel.

An admirable Strada marina runs round the bay of Kastrades S. of the citadel, and forms a much frequented public drive and promenade. The town, including the suburbs of Mandukio to the W. and Kastrades to the S., contains about 28,000 inhabitants, of which 5,000 or more are Jews. The neighborhood is adorned with gardens, country houses, olive

grounds and vineyards. Excellent roads in every direction lead through extensive plains of rich, well-cultivated land to the numerous villages, many of which are on the sides of steep, well-wooded ridges, commanding scenery not to be surpassed for grandeur and beauty in any part of the world.

**Supplies.**—Corfu affords resources of all kinds, including ship-building yards; provisions are abundant, and a copious supply of water has been brought in pipes from a source above the little village of Benizze, a distance of seven miles, and may be obtained near the health-office on the N. side of the town. Ships of war are supplied with water from a pipe leading down to the ditch of the citadel; in summer if the water becomes scarce it is necessary to go across to Butrinto on the mainland.

The principal exports from Corfu are olive oil, wine, raisins, hides, wool and citron; which are exchanged for cereals, sugar, coffee and manufactured goods.

**LIGHT.**—A *fixed* white light is shown from the citadel, at an elevation of 240 feet above the level of the sea; it is visible in clear weather at the distance of 18 miles, and may be seen from the northern, and shortly after entering, the southern passage.

**Corfu Road.**—The roadstead of Corfu extends along the N. face of the town, and is sheltered from the strong NE. winds, which blow with great violence during the winter months, by the island of Vido; it affords anchorage over an area of about two miles in length and three-quarters of a mile in breadth, in depths from 10 to 16 fathoms, stiff mud and clay. The best berth for a ship of war is about mid-channel, with cape Scala near Butrinto on the Albanian shore, shut in with the E. extreme of Vido island; small vessels moor off the camber under the citadel. Merchant vessels anchor to the westward, off the health-office and custom-house, in five to 10 fathoms; but vessels in quarantine are sent to an islet, off the entrance of port Govino, where there is a Lazaretto.

**Vido Island** is 142 feet high, of a triangular form, extending somewhat more than half a mile E. and W., and is half a mile wide at its E. side; it is nearly steep-to, except on its northern side, where there are some outlying rocks 200 yards from the shore.

**Calovero Islet.**—At nearly 800 yards westward of Vido is the rocky islet of Calovero, 30 feet high, and surrounded by shoal water; a rocky patch, with  $4\frac{1}{2}$  fathoms water on it, lies ESE.  $\frac{3}{4}$  E. of the islet and midway between it and Vido; and another patch, with  $4\frac{3}{4}$  fathoms, is 650 yards NE.  $\frac{1}{4}$  E. of the isle. The passage between the islet and Vido, should be taken only by small vessels.

**Lazaretto Island**, the quarantine establishment, is  $1\frac{1}{4}$  miles westward of Calovero islet; it is 68 feet high, and about 400 yards in length



Vessels in quarantine anchor in 13 fathoms, about 600 yards southward of the Lazaretto.

**Kastrades Bay.**—Cape Sidero, the E. extreme of the rocky mass on which the citadel of Corfu is erected, is the N. point of Kastrades bay. This bay is about three-quarters of a mile in extent, shallow, and used only by fishing-boats. Along its shore is the Strada marina, a much-frequented public walk and carriage-drive. A promontory, projecting southward from Kastrades bay, covers lake Kalikiopulo, at the mouth of which is the picturesque islet of Ulysses, 65 feet high, with a chapel on it, and once connected to the mainland by a causeway. The lake, the ancient port of *Paleopolis*, is now shallow and filling up; an extensive fishery of mullet is carried on.

**Benizza.**—At  $2\frac{1}{2}$  miles southward of Ulysses islet is the pretty little village of Benizza, under the sharp peaks of mount Decca and Santa Croce. Near the village are the springs which supply the town of Corfu with water. Vessels occasionally anchor off the village, in nine fathoms water. The land from the northward is undulating and thickly wooded.

**Buccari Point.**—The coast from the village of Benizza trends S. and eastward to Buccari point, a distance of about seven miles. The village of Mirangi is erected on the beach in the bend of the coast, and S. of a fine stream of water. Vessels occasionally anchor here, in eight or nine fathoms, sand, to load with oil.

The land here rises in thickly wooded ridges to the sharp peaks of Santa Croce and mount Decca; the former 1,476 feet and the latter 1,859 feet high, and the greatest elevation in the southern part of Corfu.

Buccari point, three miles from Mirangi, is rounded and 274 feet high; the intermediate shore is low. Under this point there is excellent anchorage in 10 fathoms, sand.

**Lefchimo Point**,  $3\frac{1}{2}$  miles E.  $\frac{1}{4}$  S. of Buccari point, is a long tongue of sand projecting to the NE., with shoal water extending a long half mile beyond it. The low shore between the two points forms Lefchimo bay, which is  $1\frac{1}{2}$  miles deep, with 16 fathoms water, in the middle; the shore around the bay is bordered at a short distance by shoal water. At a mile to the SW. of the point is the saltern of Lefchimo.

The shoal water extends to the W. and SW. of the light-vessel, and care should be taken in rounding it. The vessel should not be brought eastward of SE. by E.  $\frac{3}{4}$  E. until some white houses at the saltern or scala bear S.  $\frac{3}{4}$  E. Excellent anchorage will be found in 15 to 17 fathoms water, with the light-vessel bearing about NE. by E.  $\frac{1}{4}$  E., and the scala SE.  $\frac{3}{4}$  E.

**LIGHT-VESEL.**—At the NE. extreme of the shoal extending from Lefchimo point, a light-vessel is moored in five fathoms water,

which exhibits, at 18 feet above the sea, a *fixed* white light visible five miles.

A light is shown from a small square stone column, on the center of the pier, S. side of Potami river entrance, near Lefchimo point. The light is an oil lamp, visible three miles, and is not at all times to be depended upon.

**CAPE BIANCO**, the S. extreme of the island of Corfu, is six miles southward of Lefchimo point; the shore between is low, and bordered, at the distance of a half to three-quarters of a mile, by shoal water interspersed with rocks; there is anchorage with westerly winds all along until within about two miles of the cape, in from 10 to 12 fathoms, sand. Cape Bianco is 330 feet high, and a hill  $1\frac{1}{2}$  miles to the NW. 481 feet high. It is composed of white cliffs resembling those of Beachy head on the S. coast of England.

**Bianco Shoal**.—Cape Bianco is surrounded by a sandy shoal, which extends two miles southward, and in a SE. direction along the eastern coast, about the same distance from the cape.

Two buoys mark the outer edge of the shoal; a black one on the southern extreme, in seven fathoms of water, about  $2\frac{1}{2}$  miles from the cape; the other, a red one, on the E. extreme, in seven fathoms of water. This bank should be approached with caution, as the soundings over it are very irregular, and the buoys should not be rounded too closely, as they are often out of their position, and at times gone altogether.

The citadel of Corfu kept well to the westward of mount St. Salvador, will lead eastward of the shoal.

**Maga Khoro Point**, at  $5\frac{1}{2}$  miles to the NW. of cape Bianco, is low, and like the intervening shore, is foul and rocky. At three-quarters of a mile SW.  $\frac{1}{4}$  S. from the point is a rocky patch, with one fathom water on it; and at half a mile to the southward of the patch is a rocky bank with eight fathoms on it, the water quickly deepening to 20 fathoms.

**Lagudia Islets**.—These two rocky islets are flat, and lie a mile to the SW. of Konsia point; a dangerous reef extends nearly three-quarters of a mile to the southward of the islets. Konsia point,  $4\frac{1}{2}$  miles beyond Maga Khoro point, is low, with shoal water nearly three-quarters off it.

Vessels frequently anchor all along this coast as far as cape Bianco, in from nine to 10 fathoms water, fine sand, sheltered against the strong northeasterly winter gales, which blow with great violence.

**COAST**.—Between Konsia point and Kardiki point, about  $2\frac{1}{2}$  miles farther on, the coast is low and sandy, and within it is the shallow salt-water lake of Corissa, three miles in length and half a mile in breadth.

At Kardiki point the coast trends more to the northward as far as cape Faskia, a distance of about  $4\frac{1}{2}$  miles, and is the base of the Pavili-ana and Garuna mountains, the land ranging 1,440 and 1,530 feet high, close within the borders of the sea.

After passing the Lagudia islets, the coast, which forms an outward curve, becomes extremely dangerous, and is all along studded with rocks and rocky patches, having only two fathoms water on them, and nearly steep-to. The Bragonitica shoal, the outer danger, lies  $1\frac{1}{2}$  miles from the shore southward of Kardiki point. This part of the coast, from a mile southward of Lagudia islets, should not be approached nearer than  $2\frac{1}{2}$  miles.

**St. Giorgio Point.**—The islet of Tholetho, with a large rock above water close to it, just to the N. of cape Faskia, forms on the E. the little port of Nicolo di Mitika, 400 yards wide, which is visited by small coasters. The shore to the N. is a sandy beach, followed by an irregular rugged coast, the land immediately within being from 785 to 893 feet high. Gordi islet or rock lies about  $2\frac{1}{2}$  miles northward of Tholetho islet, and 600 yards from the shore, with five fathoms within, and deep water half a mile outside it.

St. Giorgio point,  $2\frac{3}{4}$  miles farther on, is close at the foot of a high, round, steep promontory reaching 1,288 feet above the sea, named mount St. Giorgio; its coast line is irregular, rugged, steep and rocky.

**Plakka Point.**—A small stream, after watering a fertile valley, runs into Ermones bay, N. of mount St. Giorgio; the latter at a distance appearing isolated. At  $1\frac{1}{2}$  miles northward of St. Giorgio point is Plakka point, which is high and slightly projecting, with 50 fathoms water near it; and three miles farther on is the entrance to Liapades bay; the intermediate coast, which is skirted close in with rocks here and there, is precipitous, the land within rising in high, bold ridges. The islet of Koliviri, 200 yards in diameter, and steep-to, lies a mile NW.  $\frac{1}{4}$  N. of Plakka point, and nearly half a mile from the cliffy shore.

**Cape Palacrum.**—Liapades bay, which extends in towards the NE. upwards of a mile, affords shelter with northerly and easterly winds, and vessels occasionally anchor in 10 fathoms water, fine sand. From the head of Liapades bay, the coast, which is high and cliffy, trends westward  $2\frac{1}{2}$  miles to cape Palacrum, and forming between, the two little ports of Alipa and St. Spiridione, which are open to the southward, and only fit for coasting craft and fishing boats. At a short distance from the coast the water is deep. During strong NW. winds the squalls from the land are very heavy. Cape Palacrum rises from the sea in bold, precipitous cliffs, and is easily known by the castle of St. Angelo,

the picturesque ruins of a Venetian fortress, standing on one of its rugged crags, 1,080 feet above the sea.

**St. George Bay.**—Cape Arilla, two miles northward of cape Palacrum, is round and bold, about 390 feet high, and the termination of a tongue of land projecting nearly a mile to the SW., and which forms the W. side of St. George bay. At the head of the bay is a fine sandy beach; and in the northern corner there is good summer anchorage in six to nine fathoms, sand, but, being exposed to the SW., is seldom resorted to. Immediately N. of cape Arilla is a little bay fit for boats, named port Timone.

**Cape Kephali**, at about  $2\frac{1}{2}$  miles northward of cape Arilla, is a low tongue projecting westward, the land within rising in peaked hillocks; the intervening shore forms a bay, the first part being cliffy followed by a fine sandy shore; the bay is shallow and rocky. In the center of the bay, nearly  $1\frac{1}{2}$  miles from the shore, is the islet of Kravia, 218 feet high, about 800 yards in length N. and S., with two islets or rocks at its N. end, and a sunken rock close to its S. end. In case of necessity a vessel might anchor with westerly winds on the E. side of this islet.

**Cape Drasti**,  $3\frac{1}{2}$  miles to the NE. of cape Kephali, is a low, white, chalky projection, surrounded by a shoal which extends 800 yards to the northward, with two and three fathoms water on it. The coast between the two capes, except just beyond cape Kephali, is composed of steep chalky cliffs, bordered all along by shoal water, and nearly midway is a bank with two and three fathoms on it, extending a mile from the shore.

**North Coast.**—From cape Drasti the coast, which is generally low and sandy, trends eastward rather more than eight miles to cape St. Katerina, the N. extreme of Corfu; it forms a curve to the southward, with the sandy bays of Sidari and St. Giorgio, and the the shore all along is bordered by shoal water and rocks. The thickly wooded slopes of the land within, are well cultivated at their base with small fertile plains. Vessels frequently anchor in both Sidari and St. Giorgio bays. From Sidari, communication with the town of Corfu is by a fine carriage-road, and fresh water may be obtained from a stream E. of the little village near the beach.

**Astrakari Shoal.**—At  $3\frac{1}{2}$  miles eastward of cape Drasti is Astrakari point, easily known by its white cliffs, and separating Sidari and St. Giorgio bays. At nearly  $1\frac{1}{2}$  miles N. of Astrakari point is the dangerous rocky shoal of the same name, with only one fathom water on it, and about 600 yards farther to the NW. is another shoal, with four fathoms on it.

The N. point of Diaplo islet, open of cape Drasti, bearing about

WSW., leads to the northward of the above dangers; and St. Giorgio monastery in Epirus, open of cape St. Katerina, E.  $\frac{3}{4}$  S., also leads northward of the shoals.

**Diaplo islet.**—This islet is nearly two-thirds of a mile in length N. and S., 152 feet high, cliffy and surrounded by rocks; its S. end lies  $1\frac{1}{2}$  miles NW. by W.  $\frac{3}{4}$  W. of cape Kephali. At half a mile eastward of the southern part is a dangerous rock with one fathom water on it, and steep-to all around.

Diakopo islet, 101 feet high, adjoining the SW. side of Diaplo, is also cliffy, with a sunken rock at its W. end.

**Karavi** or Ship rock is about three-quarters of a mile westward of Diakopo; it is 98 feet high, and steep-to. About 200 yards SE. of Karavi is another large rock or islet; and two thirds of a mile S. is Plakka islet, low but bold.

The current among these islets, and between them and the mainland, is occasionally rapid.

**Samothraki** is an island two miles in length in a N. and S. direction, its average breadth about half a mile, 500 feet high, and skirted all round by rocks. It is inhabited by a few families who cultivate the few patches of ground, and attend to the feeding of sheep and goats.

Nearly midway between its SE. extreme and Karavi islet, a little southward of a direct line, is a rocky patch with only one fathom water on it, and seven fathoms on either side. At the SW. part of the island, a rocky shoal extends off a mile in that direction, and at its extremity is the little islet of Platia; to the SE. of Platia, distant two-thirds of a mile, is a shoal with two fathoms water on it.

Trachia, an islet 92 feet high, lies about three-quarters of a mile off the W. side of Samothraki, and half a mile N. of the islet is a rock above water. Another rock above water lies half a mile to the NW. of the N. end of Samothraki; and nearly  $1\frac{1}{2}$  miles WNW.  $\frac{1}{4}$  W. from the N. end of the same island is a rocky patch with two fathoms on it.

Samothraki and the above islets and dangers, lie on a bank with irregular soundings, and which is connected with Corfu. Vessels passing between Fano and Samothraki should keep nearer the former island to avoid the rocky two-fathom patch just mentioned.

**FANO** (ancient *Othonas*), is the largest of the islands off the NW. part of Corfu, from which it is distant  $11\frac{1}{4}$  miles, and 42 miles from cape Santa Maria di Leuca, Italy. The island is three miles in length in a SW. by W.  $\frac{1}{4}$  W. and NE. by E.  $\frac{1}{4}$  E. direction, and from its western side, which is two miles in extent, its breadth decreases eastward. Its greatest elevation is at the SW. part, which is 1,339 feet, and that at the NW. end, 1,034 feet high, covered with pine trees, and from the

westward appears forked; the western side is precipitous and slopes eastward.

The island rises from the outer extremity of the bank extending from the NW. part of Corfu, and the 100-fathom line of soundings passes about two-thirds of a mile from its W. side.

Fano is skirted by rocks and shallow patches. A small bay on the S. side of the island, affords shelter to a few coasting craft, against the strong NW. summer breezes. The Osprey rock, with one fathom on it and deep water around, lies about half a mile SE.  $\frac{3}{4}$  S. nearly, of the W. point of the bay, and about equidistant from both points of the bay.

Kastri point, the E. extreme of the island, is 324 feet high, and has the remains of a Venetian fortress on it. Two dangerous rocky shoals lie near the point; one of some length, with one fathom water on its southern head, with six and seven fathoms around it, lies three-quarters of a mile to the NE. by E.  $\frac{1}{4}$  E. of the point; the other, with two fathoms, lies nearly S. half a mile from the point. When in this vicinity caution is necessary with reference to these dangers. Vessels frequently anchor in the sandy bay between Kastri and Avlaki points.

The island contains about 1,000 inhabitants, and a small detachment of soldiers. The former are principally seafaring men, who carry on a small trade along the neighboring coast. Provisions of all kinds are brought from Corfu, but the coasts abound in fish, and quail are plentiful on the island. Fresh water may be obtained in small quantities from a well in Avlaki bay.

**LIGHT.**—On Kastri point, at 360 yards from its extremity, is a round white tower, which exhibits at 346 feet above the sea a *fixed* white light varied by a *red flash* every *minute*, and visible at a distance of 25 miles. The light is obscured from the westward by the high land of the island.

**Merlera**, the most northern of the group of islands off the NW. part of Corfu, is  $6\frac{1}{2}$  miles eastward of Fano, the passage between them, with the exception of the shoals off Kastri point, being clear of danger. The island is  $1\frac{1}{2}$  miles in length, and 435 feet high at its N. end; its N. and W. sides are cliffy and fringed with rocks, the cliffs on the N. side being white. On the S. side is a fine sandy bay, which is used by small craft, but it is exposed to southerly winds and a heavy swell rolls in. A fine stream runs into the sea from copious springs on its E. side. The population is about 400, principally seafaring men.

**PAXO** (ancient *Ericusa*), the smallest of the Ionian islands, is nearly  $5\frac{1}{2}$  miles in length in a NW. and SE. direction, not quite two miles in breadth, and its greatest elevation 809 feet; its shores are generally bold, particularly on the W. side, which rises in steep white cliffs.

In general the island is flat, and covered with one dense olive plan-

tation, producing the finest oil in the seven islands. The principal town, Gayo, once a small fishing village, is of considerable extent, the houses are well built, and a fine wharf is erected along its sea face. There are several villages prettily situated amidst the thick olive groves, having an air of comfort not met with in the other islands. The island exports oil, firewood, and flat stones, and has a population of about 5,000.

**Port Laka**, at the N. extreme of the island, is an indentation about a third of a mile deep, and 200 yards wide at the entrance, with two and three fathoms water within, having a few houses at its head, where boats resort during the summer months, but, being open to the NE., coasting vessels seldom anchor here.

To the NW. of the N. point of Paxo are two or three rocks above water, off which a shallow rocky patch extends a short distance.

**LIGHT.**—On a high cliff at Laka point, the NW. extreme of Paxo island, is a white tower, which exhibits at 369 feet above the sea a *fixed* white light, said to be visible from a distance of 15 miles. From the southward, between the bearings of N.  $\frac{1}{4}$  E. and W.  $\frac{1}{4}$  N., the light is masked by the high land of the island.

**Port Gayo** is formed by two islets, fronting an indentation in the E. coast of the island; on Citadel, the larger of these islets, is a fort, and on Madonna, the smaller and NE. islet, is a light-house; the islets are connected to the shore and with each other by shoal water, which also borders the NE. side of Madonna, where there is a large rock above water. These islets form with the shore of Paxo a well-sheltered creek, with from one to 10 fathoms water, but being narrow the small vessels which enter it have to haul close to the shore, and moor head and stern. The deep water is on the N., the passage southward between Citadel islet and the town is contracted, shoal, and carries only about one fathom water. The town of Gayo is built in a semicircle at the bend of the creek, and contains about 2,000 inhabitants, who have to depend almost entirely on rain for their supply of water. Small supplies of provisions may be obtained. At  $1\frac{1}{4}$  miles NW. of Madonna light-tower there are some rocks above water, but close to the shore.

**LIGHT.**—The light tower on Madonna islet is circular and white, and exhibits at 107 feet above the sea a *fixed* white light, said to be visible 10 miles.

**Spuzzo and Prasses Bays** are small inlets on the SE. and SW. points respectively of Paxo island. They are available only for small coasters.

The islet of *Kalkonisi* lies about 200 yards off the SE. point of Paxo,

**Anti Paxo** is two miles in length, a mile in breadth, and generally level but rises at its N. end to an elevation of 353 feet. It extends in.

the same direction as Paxo, from which it is separated by a deep passage about a mile wide, in which there are strong current eddies; the coast is bordered by a narrow bank with a few rocks, but free from danger, with the exception of a two-fathom patch off its N. extreme. Several small islets or rocks named Plakka lie off its S. end, terminating in a reef a little more than 200 yards distant, when the water suddenly deepens.

On the E. side of the island is a small bay, near the only village, where their fishing boats remain. There are but few inhabitants, who cultivate patches of land, which produce excellent fruit.

**Madonna Shoal.**—This dangerous rocky shoal extends about a mile in a NW. and SE. direction, its outer edges having from three to five fathoms water, where it suddenly deepens; the shoalest part lies about two miles E.  $\frac{1}{4}$  N. nearly from Madonna light-tower, and at times uncovers. Its northern edge is marked by a red buoy. Sailing vessels should avoid its vicinity on account of the current.

Mount Mavronoros, bearing about N.  $\frac{3}{4}$  W., just open westward of Sivota island, leads westward of the shoal. When Madonna light-house bears W.  $\frac{1}{4}$  S., a vessel will be between it and the shoal, and if from the northward may steer to the SE. The NW. extreme of Anti Paxo, in line or only just open of the SE. extreme of Paxo, will also lead westward of the shoal.

Mount Mavronoros bearing N., westerly, and well open eastward of the W. peak of Sivota island, leads eastward of the shoal.

The channel on either side is clear and the water deep; vessels beating to the northward should keep the Albanian coast aboard, particularly towards sunset, as at night the wind is almost certain to be off the land, and the current also runs along this shore.

**Directions—North channel.**—Vessels approaching from the north-westward or from the Adriatic, with northerly or westerly winds, should make for Fano island, and leave it with Merlera island on the starboard hand. Arriving from the westward with a commanding breeze, and taking the passage S. and eastward of Fano, give this island a fair berth, but pass nearer to it than to Samothraki, and steer for the S. end of Merlera, and thence for the N. point of Corfu.

On entering the N. channel of Corfu, steer for Tignosa light-house and pass about 300 or 400 yards to the westward, or between it and the shore of Corfu; then bring it to bear NNW., and steer SSE. until the old mill S. of St. Stefano point bears W.  $\frac{3}{4}$  N.; when the vessel will be southward of the Serpa rocks, and may steer as convenient to the S. by W.  $\frac{1}{4}$  W. for Corfu road.

A vessel passing eastward of Tignoso light-house should keep the S. end of Merlera island open of the N. point of Corfu, until within a long



half mile of the Albanian coast; then steer to the southward midway between the coast and the Barchetta rock (not larger than a small boat bottom up), taking care not to bring Tignoso light-house to bear more to the N. than NNW. until the old mill bears W.  $\frac{3}{4}$  N.; then proceed as before.

With variable or contrary winds, it is advisable to keep the Albanian shore aboard until southward of the Serpa rocks.

**At Night** a vessel should steer for Tignoso light, pass 300 or 400 yards westward of it, then bring it to bear NNW. and keep it on this bearing until the light on the citadel of Corfu bears S. by W.  $\frac{1}{4}$  W. The vessel will then be about  $1\frac{1}{2}$  miles from Tignoso, and southward of the Serpa rocks off the coast of Corfu, the only danger, and should be guided to Corfu road by the citadel light.

In taking the passage between Tignoso and the coast of Albania, give the light a berth of nearly a mile, and when at this distance to the eastward of it, with Corfu citadel light bearing S. by W.  $\frac{1}{4}$  W., steer this course, which should lead nearly midway between the Barchetta rock and the Albanian coast. When Tignoso light bears W.  $\frac{3}{4}$  N. the vessel will be southward of the Barchetta rock, the S. by W.  $\frac{1}{4}$  W. course should be continued, taking care not to bring Tignoso light to the northward of NNW. until  $1\frac{1}{2}$  miles southward of it, and give the coast of Albania a prudent berth.

In working through the N. channel, keep the Albanian shore aboard, as it is bold and clear of danger, and stand only half channel over to the westward, until southward of the Serpa rocks.

**Directions—South Channel.**—The distance between cape Bianco and the N. end of Paxo is seven miles, but the passage is contracted to about  $5\frac{1}{2}$  miles by cape Bianco shoal. Approaching from the westward, keep in mid-channel, giving cape Bianco a berth of at least three miles, and in rounding it at this distance the vessel's position should be checked by bearings. A line between the N. end of Paxo and the W. peak of Sivota island passes southeastward of Bianco shoal; the soundings on the shoal are irregular, and the buoys are not to be depended upon.

In coming from the southeastward between Paxo and the mainland, the passage on either side of the Madonna shoal is clear and deep, and to avoid this danger vessels should be guided by the marks and bearings already given. Preference should be given to the passage eastward of the shoal, and in a sailing vessel the Albanian shore should be kept aboard, particularly towards sunset, as at night the wind is almost certain to be off the land; the current also along this coast sets to the northward.

The citadel of Corfu kept well to the westward of mount St. Salvador

will lead eastward of Bianco shoal; the coast of Albania as far N. as Prasudi islet, is clear and bold; Lefchimo point and light-vessel should have a berth of about a mile; and to the N. of Prasudi islet, the white houses of the village of Murzo should be kept open of Prasudi to avoid the Bacchante flats, which are steep-to. When Corfu citadel light is seen, alter the course as convenient.

If the land should be made in a gale of wind from the southward, and it should be found impracticable to fetch sufficiently to windward of the dangers off cape Bianco, a vessel may bear-up for the passage between Fano and Samothraki islands, and proceed as heretofore directed; under the lee of Corfu the vessel could await the termination of the gale, or anchor in St. Giorgio bay.

**At Night.**—Bring Laka light to bear S.  $\frac{1}{4}$  W. distant  $3\frac{1}{2}$  miles, and steer NE.  $\frac{1}{4}$  E.  $4\frac{1}{2}$  miles, or until the light bears SSW.  $\frac{1}{2}$  W. If these bearings and distances are correctly estimated, the vessel should be off the SE. tail of cape Bianco shoal, and if Madonna island light is seen, it should bear S.; then steer N. by W.  $\frac{3}{4}$  W., and when Lefchimo, or Corfu citadel light is seen, alter the course as necessary.

From the southeastward, between Paxo and the mainland, if westward of Madonna shoal, keep at a prudent distance from Paxo, and do not bring Madonna island light to bear westward of WNW.  $\frac{3}{4}$  W. until within a mile of the light or equi-distant between it and the shoal; then bring the light to bear S. and keep it on this bearing as long as it is in sight or until Laka light bears SSW.  $\frac{1}{2}$  W. and distant  $7\frac{1}{2}$  miles; then proceed as before.

It will, however, be more advisable, especially in a vessel under sail, to pass eastward of the Madonna shoal. In this case keep in mid-channel or well over on the Albanian coast, which is clear and bold, and the distance from the Madonna shoal may be estimated by the bearings of the light. In proceeding to the northward, when near Bianco shoal, do not bring Madonna light to bear eastward of S. or Laka light southward of SSW.  $\frac{1}{2}$  W. until both these bearings are on; then proceed as before.

**Winds.**—Southeasterly and southwesterly winds, accompanied by cloudy weather and heavy rains, are prevalent in Corfu channel during the winter; and northerly and northwesterly winds sometimes blow with violence, but do not last long. In the summer season the breezes are generally light.

**Currents.**—The currents are rapid, especially between cape Scala and port St. Stefano; their general direction is N., but there is ordinarily a surface current depending upon the force and direction of the wind; in strong winds it attains a speed of between  $1\frac{1}{2}$  and two miles an hour.

## CHAPTER XIV.

### GULF OF ARTA AND COAST OF GREECE.—SANTA MAURA, CEPHALONIA, ITHACA, AND ADJACENT ISLANDS.

VARIATION in 1883.

Prevesa,  $7^{\circ} 49'$  W.

Port Argostoli,  $8^{\circ} 00'$  W.

Gulf of Patras, entrance,  $7^{\circ} 39'$  W.

**GULF OF ARTA.**—This gulf (ancient *Ambracius Sinus*) is  $18\frac{1}{2}$  miles in length from Prevesa to the shore of Makrinoro ridge on the E., where its extreme breadth is about 10 miles, but the coast line is so irregular and indented by bays, with long projecting points, that in places the latter are little more than three miles apart from N. to S. There are a few islets in the gulf, some of which are covered with shrubs and verdure; the chief group is between Salaghora road and those extending from Palmatero point at the entrance to Arta river.

Nothing can be more beautiful and picturesque than the natural scenery of this gulf, and the numerous Greek and Roman ruins on its margin must always afford peculiar interest to those who have the good fortune to visit them. About an hour's walk, or about three miles to the N. of Prevesa, are the celebrated ruins of Nicopolis, scattered in various directions. At the foot of a range of hills on the N., just on the slopes, is a large amphitheater, with its front facing the S., the most conspicuous and perfect of all the ruins now to be seen.

The hills, mostly throughout the shores of the gulf, are composed of rugged blocks of primitive limestone, in the crevices of which grow the wild myrtle, numerous ferns, prickly shrubs, and several bulbous roots; also, a little scarlet blossom, from which the Turks and Greeks manufacture the beautiful scarlet dye used for their caps and dresses, as well as a yellow flower, from which a corresponding dye is produced; both these flowers are valuable as a source of trade.

**PREVESEA.**—This town stands just within the entrance of the gulf of Arta, to the NW., and lies along the shore, having a fine plain to the N. and W., studded with houses and interspersed with olive trees. The streets are narrow, uneven, and often unpaved, and the houses are chiefly constructed of wood or built in Turkish style out of the adjoining ruins of Nicopolis. It was formerly one of the possessions of Venice,

was subsequently occupied by the French, and was destroyed by the Turks in 1798.

It is fortified by a dry moat or ditch, which surrounds it on the land side, the walls in many places being almost in ruins. Fort Nuovo within the walls on the N., is in pretty good repair, and contains the Pacha's palace, principal mosque, and residences of the chief authorities. It defends the N. side of the harbor and the channel leading up the gulf. Fort St. Giorgio, at the SW. angle of the town, is well built, and guards the entrance and anchorage of the port. Fort Pantakratora, which entirely covers the approach to the entrance of the gulf, and surrounded by a wet ditch, is much dilapidated, with its interior in ruins.

Prevesa communicates by telegraph with Arta and Janina, and holds direct communication with Corfu by means of the Austrian Lloyds Company's steam-vessels, one of which calls every Sunday; but in consequence of the entrance of the gulf having only about 12 feet of water, a small steam-vessel is used to reach the town. Trade with the neighboring Greek ports, and in Greek vessels, is tolerably brisk, especially with the island of Santa Maura, which provides this part of the province with wine. The only machinery in the town is a steam olive-press and a corn-mill.

British vessels call here in the beginning of each year, on their way up the gulf of Arta, whither they proceed for valonia, which grows plentifully on the Greek coast, but before proceeding thither the vessels' papers are deposited in the vice-consulate at Prevesa, there being no British consular officer at any of the places where they load. The coasting trade is almost entirely carried on by Turkish or Greek boats of from two to 20 tons burden. Fisheries here afford occupation to about 100 men, the produce in each year amounting to 895 tons, valued at about 25,000*l*. Crabs are found in the gulf of Arta, and a species of small cod-fish similar to those on our own coasts.

The exports, which consist principally of cattle, olive oil, goat and sheep skins, wool, cotton, and valonia, amount in each year to about 126,046*l*.; and the imports, consisting of cotton and woollen goods, coffee, sugar, rice, flour, rum, glass, hides, iron, crockery, cordage and timber, amount to about 94,430*l*. The number of vessels entered in 1875 was 3,257, amounting to 51,635 tons; and the number of vessels cleared amounted to 3,216, equal to 51,352 tons.

**The Port** of Prevesa is bounded on the W. by the walls of the town, and on the E. by a low sandy promontory, which terminates on the N. in Akri point, on which are the ruins of a tower; its area is nearly 1,400 yards N. and S., and about 800 yards E. and W., with from seven to 10 fathoms water. A fair berth for anchoring is with Akri tower ENE.  $\frac{3}{4}$  E.

and the SE. bastion of Prevesa S. by W.  $\frac{3}{4}$  W. in about eight fathoms, mud.

A long shoal flat, from a little southward of fort Nuovo, borders the shore to the northward, but this is just to the N. of the parallel of Akri point, and beyond the anchorage.

**Bar.**—Prevesa strait, the entrance to the gulf of Arta, is easily distinguished from seaward by the white forts of Pantakratora and Punta, the former having on its sea-face a double tier of guns, the latter being triangular, on the low shore on the E. side of the strait, and  $1\frac{1}{2}$  miles within or to the NE. of Skilee, the low S. point of entrance. The strait is barred by an extensive flat, the outer edge of which extends from Pantakratora fort in an outward irregular curve southward to Skilee point,  $1\frac{1}{2}$  miles distant.

The bar consists of an accumulation of sea-weed, coarse sand and gravel, apparently formed from deposits from the ebb of the gulf, and banked up by the flood and resistance from the sea. It is covered with small knolls of a darker shade than the rest of the bottom, and being a little shoaler, they are always perceptible, unless it blows hard to ruffle the water.

No leading marks can be given for crossing the bar; two buoys, the northern black and the southern white, are supposed to mark the channel, and in 1864 three fathoms was carried through, but as the bar shifts and the passage is circuitous, a local pilot should be employed. The probable depth now on the bar is about two fathoms.

**Anchorage.**—Vessels generally anchor outside to wait for a pilot, in seven or eight fathoms water, with Mytika bluff bearing N. by W.  $\frac{1}{2}$  W., and fort Punta ENE.  $\frac{1}{2}$  E. northerly; the bottom is foul. A large ship should anchor farther out in  $9\frac{1}{2}$  or 10 fathoms, mud, with Mytika bluff N. by W.  $\frac{1}{4}$  W. northerly.

**Current.**—A current is frequently found setting over the bar at the rate of  $2\frac{3}{4}$  miles an hour, changing every six hours; but with strong westerly or easterly winds, its strength and direction are irregular. The rise and fall of tide is about one foot.

**Port Vathi.**—The mouth of this inlet is half a mile N. of Prevesa, and it runs in more than half a mile in the same direction, carrying from eight to three fathoms water, until within 200 yards of its head, when it becomes shoal. At a little distance up the inlet on the right is a fine spring of clear water, near some ancient Roman ruins, and near the NW. shore are the wrecks of some vessels of war, in three fathoms water.

**Coast.**—From the entrance of port Vathi, the shore eastward for two miles is a sand and shingle beach, in front of a low natural bank, and at the foot of some well-cultivated sloping hills. Along this shore there

is plenty of fresh water, obtained from wells not far from the beach, and so good, that it is sent for from Prevesa. This beach is a common resort for fishermen, who draw their nets on it; they shoot them by the moon, affirming that the currents or tides in the gulf of Arta are influenced by her. They say as she rises towards the meridian the stream runs in, and as she descends towards the horizon it runs out. Some observations appear to confirm this theory.

Beyond the sand and shingle beach is a small bay, where, at a few paces in the rear of the beach, is a lagoon abounding in mullet and cockles; and about a quarter of a mile up the valley is a farm pleasantly situated, being surrounded by hills, from which several streams flow and unite at this spot, where they form a small rivulet and run into the lagoon.

**Cape Skara**, the SE. extreme of the small bay just mentioned, and the termination of a peninsula projecting  $3\frac{1}{4}$  miles to the SE., is 485 feet high, with a tower on it, and bold close-to.

**Akri bank**.—The low shore of Akri point is bordered on either side by a shoal bank, which on the E. extends in that direction a long mile; vessels bound up the gulf should be careful in rounding it. No marks can be given, but in steering to the northeastward from the anchorage at Prevesa, by keeping about 300 yards from the point or one-third the distance across towards Prevesa, will be nearly mid-channel between Akri and fort Nuovo shoals. When the minaret in port Nuovo bears W.  $\frac{1}{2}$  S., keep it on this bearing, which will clear the Akri bank and the tail of the shoal extending from the N. shore.

**Prevesa Gulf**.—The shore from Akri point for about three miles to the SE. is low and sandy; farther on it begins to assume a hilly aspect, and inclines more to the E. until it reaches two or three little bays. The Akri bank, which extends a mile eastward of the tower, gradually inclines towards the shore, until it terminates near the western of the little bays; the bank should not be approached nearer than eight fathoms water, as it is steep-to.

At the termination of the sand the coast turns nearly at a right angle to the N., and is a bold, precipitous tongue of land terminating in cape Panaghia, and forming the E. side of Prevesa gulf, the western side being the low shore southward of Akri point. There are a few low cliffs along the coast commencing from the sand, which indicate the nature of the soil to be ferruginous or of an ochrey marl shown in vertical strata. There are or were extensive ruins on this promontory.

**Guidronisi and Kephalo islets**.—The large basin of the gulf of Arta opens between the two bluff headlands of capes Skara and Panaghia, and which are steep-to. The rocky islet of Guidronisi lies a short

mile to the NE. of cape Skara, and a third of a mile from the shore, having some rocks on its N. side, but deep water around it.

The islet of Kephalo lies a short half mile to the NE. of cape Panaghia; a shoal extends from the cape more than half way across, leaving between it and Kephalo a narrow space with 17 fathoms water. Kephalo is surrounded by a rocky shoal at the distance of about 100 yards, but further off at the NW. end, where, on the edge of the shoal, is a rock above water.

**VONITZA BAY**, between capes Panaghia and Gheladha, is two miles wide, and falls back S. to the town of the same name at its head, about the same distance. It presents a grand and interesting view of an extensive valley or plain, bounded on either side by steep wooded mountains, and watered by several streams which run from their sides.

The streams which flow through the valley are shaded by the huge branches and foliage of the plane tree, affording a cool and refreshing retreat from the scorching rays of the sun in summer. These trees are about the size and have the appearance of the largest oak trees, and much improve the beauty of the scenery in the valley.

The fortress of Vonitza is evidently Venetian, built on a steep hill on the SW. margin of the bay overlooking the town to the E., and fronting the bay to the NE., and on all sides commands every approach. On the W. side of the fort an extensive lagoon washes the foot of the hill on which it stands. In the fort are one or two excellent springs of water, which are remarkable, being on a high rocky hill.

There is anchorage at about half a mile N. of the town, in seven or eight fathoms, or at any convenient distance. Vonitza contains about 3,500 inhabitants.

**Water.**—An excellent stream of water runs through the town, which takes its rise in the mountains at the farthest extremity of the valley of Vonitza; a branch of this stream also runs into the sea between the town and little village of Bughat, just to the eastward, and which is a good place for boats to water.

**Cape Gheladha.**—To the eastward of Vonitza is an islet close to the shore; hence the sandy shore, which forms the beach from the town, continues a quarter of a mile farther; then the coast changes, abruptly turns to the N., and terminates at cape Gheladha, the E. point of the bay; the coast is steep, with several small inlets, where boats can be beached, deep water all along, and backed by hills inclining from mount Amydros.

**Mount Amydros**, about two miles eastward of Vonitza, is 1,483 feet high, and the northern height of the range of mountains bounding the E. side of the plain extending southward from Vonitza. The view from

its summit embraces an extensive horizon, commanding the gulf beneath with its circling eddies caused by the streams of the Arta and Euro; also, some of the Ionian islands, and the mountains of Suli, Pindus and Eota, with their tops capped with snow and generally above the clouds. It amply repays for the fatigue of the rugged ascent up the mountain, more especially if it be at sunrise or sunset, when the distant tints of the mountains are rich and when the shades are definable sufficient to give a bold outline to the distant prospect.

**Coast.**—From cape Gheladha to Volimi point, about three miles eastward, the coast is bold, skirted close to by sunken rocks; at first more steep, abrupt, and woody, declining towards the latter point. The soil in several places is argillaceous mixed with chalk, and thickly covered with dwarf oak and brushwood; but some parts westward of Volimi and near the shore are low and swampy; off this the water is more shallow, but deepens as Volimi point is approached. Following the low sandy point of Volimi is the bay of Ruga, which terminates on the E. in Kaliki point, which is low and sandy, similar to cape Gheladha. In this neighborhood lead ore has been found.

**Ruga Bay** is two miles wide at the entrance, and about  $1\frac{1}{2}$  miles deep, with from five to eight fathoms water. On the S. shore, a little removed from the beach, are some extensive Pelasgic ruins, situated on the northern border of a large lake that washes the walls. A little to the E. are some ruins of Roman origin. These ruins are supposed by some to be the remains of Limnea. Near the Roman ruins in the bay there is a fine spring of fresh water.

The land bordering the lake inland is hilly and thickly wooded with oak of small growth; the bark and acorns of which (called valonia) are articles of commerce and used for tanning. In the interior there are forests of large timber. The lake of Ruga abounds in fish, and is the resort of pelican and other aquatic birds.

**Balim Bay.**—Kaliki point, the eastern extreme of Ruga bay, notwithstanding it is low and sandy, has 20 fathoms water close to it. The shore thence trends nearly S. for about  $1\frac{1}{2}$  miles, when Balim bay opens to the westward. The depth of water along this shore, from 20 fathoms, near Kaliki point, shoals suddenly at the same distance off, to  $4\frac{1}{2}$  fathoms, but there are no hidden dangers. In about the center of Balim bay there is good anchorage, in five fathoms, mud. On the N. shore a fine spring of water oozes out beneath a low cliff of light-colored marl.

The country to the S. and SW. of the bay is low and swampy for a considerable distance; beyond which it rises in steep rugged hills and mountains, with deep rents and chasms between them.



**Loutraki Bay.**—The points of entrance to this bay are  $3\frac{1}{2}$  miles apart, and from a line between, the shore falls back to the S.  $2\frac{1}{2}$  miles; on the W. it is bounded by the low shore just mentioned leading to Balim bay, and terminates on the E. in Makriamiti point. In the SE. corner is a snug little basin or cul de sac, like a wet dock, about a mile in circumference, but does not show itself until in the narrow channel that leads into it; the E. and W. sides are bounded by steep hills, the interior shore being a shingle beach, and along the W. side is a road leading to Misolonghi. In this singular little basin a fine spring of fresh water bubbles from under a rock on its W. side, but so near the edge of the salt water that it is with difficulty it can be collected.

The land on the E. side of Loutraki bay gradually declines in height towards Makriamiti point, with a few sandy creeks where boats can beach; it is steep and cliffy, having a peculiar appearance of alternate layers or strata of soil and quartz, some vertical, others horizontal, in which quantities of vegetable petrifications are embedded. It is all along bold, skirted close-to by sunken rocks, and can be approached to within a prudent distance. The country in the vicinity of Makriamiti point has a rocky sterile appearance; it is covered with stunted shrubs with here and there a few olive trees.

**Kervasara Bay.**—This bay is in the SE. corner of the gulf of Arta; its entrance between Makriamiti point and the foot of Mavro Vouni (Black hill) to the NE., is about two miles wide, and it runs SE. nearly four miles, the coast being bold with deep water throughout, except a shoal with two fathoms water on it close-to the shore at its head, and about a third of a mile eastward of the village of Kervasara.

A submarine volcano is said to exist within the bay of Kervasara, about 150 yards N. of the shore, with about two fathoms water on it; no bearings are given, but lat.  $38^{\circ} 52'$  N. long.  $21^{\circ} 16'$  E. is noted. Two eruptions are reported to have taken place; one in November, 1847, the other in February, 1865. Fish and shell-fish were destroyed, and the sea covered with sulphur which floated as far as Prevesa, the smell of which lasted for five months. Sulphur continues to issue from the crater, especially with SW. winds.

At the head of the bay near the village, and at the beginning of a deep glen, are the ruins of the ancient city of Argos Amphilocheium, part of the walls of which are washed by the sea. The ruins exhibit two walls of solid blocks of rough marble, ascending a hill at an angle of about thirty degrees from the beach at the head of the bay, and for a considerable way up the walls are perfect. The principal part of the ruins surround the summit of the hill in a circular form about  $\frac{2}{3}$  of a

mile in diameter, with numerous square towers projecting outwards, with which the two walls are united.

The road from Albania to Misolonghi winds through the glen, a formidable pass, being narrow and commanded by craggy fastnesses that must afford protection to any repelling force.

To the S. of Argos Amphiloichum is lake Ambrakia, between two chains of mountains; on each side of which the road branches.

The neighborhood of Kervasara is reported to be the most healthful in the gulf, not being subject to the malaria so obnoxious everywhere else.

**East Coast.**—Following the E. shore of the bay of Kervasara is the bay of Armyro, a shallow salt water lagoon a mile in extent E. and W., with its narrow mouth open to the southward. The shore thence for three miles northward, passing the hamlets of Vlika and Arapi, S. and N. of the base of Mavro Vouui, is shoal for nearly half a mile off. The country in the rear is low and swampy.

The coast along the base of the Makrinoro ridge is bold and in most places inaccessible, except at the foot of the deep ravines between the hills, where a small sandy cove may permit a boat to be beached, but these ravines, as also the hills, are so overgrown with thick tangled underwood as to render a pass through it impracticable. The road leading from western Greece to lower Albania runs along the upper part of these acclivities, and in a military point of view is a strong pass.

**North Coast.**—The N. coast of the gulf of Arta is one unvaried but irregular continuation of swamps, marsh, and lagoons, in many places separated from the water of the gulf by a narrow strip of sand and mud, which in winter is overflowed and gives to the appearance of the gulf a much more extensive area than it has in reality, as these lagoons and swamps run a considerable distance towards the more elevated land. To these extensive swamps and undrained land may be attributed the baneful effects of malaria that renders this country so unhealthy in the summer, more especially in the months of August and September.

Large snakes and reptiles, some of which are venomous, dwell in the rushes of these marshes, and swarms of mosquitoes are troublesome, not only here, but in every part of the gulf of Arta.

These lagoons abound in fish and enormous prawns, and are the resort of vast quantities of wild aquatic birds, among which are numerous flocks of pelicans that feed on the finny inhabitants of the gulf. The Ambracius Sinus was anciently celebrated for its fish, which it appears to have retained to this day, although the fishermen are indifferent.

The rivers Luro (ancient *Charadrus*) and Arta (ancient *Aracthus*) flow through the extensive plains and swamps that are formed between the gulf and the mountains from whence they take their rise.

The soundings all along the northern shore are very irregular, and the lead is the only guide when in its vicinity.

**Arta River.**—This river discharges into the sea about  $4\frac{1}{2}$  miles westward of Paleo Pyrgo at the NE. corner of the gulf, winding in serpentine reaches from the city of the same name. It is navigable for boats a distance of about four miles, and were the obstacles removed, such as trunks of trees and masses of the banks that are torn down by the torrents, it might be available almost to the walls of the city or the bridge that is near it. The mouth of the river shifts; the old mouth,  $2\frac{1}{2}$  miles westward of the present one, is closed by sand and mud.

There are several villages on the banks of the river; Komano, about three miles up, is on the left bank; about two miles farther up is Nekhori, on the right bank; and three miles beyond, on the same bank, is Kalamo. Around these villages the land is indifferently cultivated, although the soil beyond the swamps appears to be a rich alluvial bed, highly capable of tillage.

The city of Arta is on the eastern bank of the river, about seven miles in a direct line from its mouth. It occupies a part of the site of ancient *Ambracia*, the remains of which in places are included among the modern Turkish and Greek buildings, more especially in the fort. The regular oblong square stones of immense size, minutely fitting together like brick-work, without cement, and said to be the architecture of the Hellenians, compose the substructure of the citadel on which the Venetians raised a fortification, and the Turks added a little of their style of building to the interior of the fort. One of the stones in the eastern wall of the citadel is 15 feet long and five feet broad, and most of the others are nearly the same size. The population of Arta is about 15,000.

**Koraka Islets.**—Of the islets in the gulf, the chief group is between the mouth of the Arta and mount Salaghora; they extend southward from Pothani point, and appear once to have been connected with it, consisting wholly of soil. Earthquakes or impetuous floods may have severed them from the mainland, occurrences of frequency hereabouts. The largest and southernmost of these islets is named Vouvalos. Between these islets and the present mouth of the Arta, a long broken point projects to the S. with shoal water around it. Vessels in this vicinity should be guided by the lead.

**Luro River.**—This river is a rapid stream finding its way into the gulf through a swamp to the W. of the large lake of Zukalia; the latter, extending to the eastward and southward, reaches the high land of

mount Salaghora. About seven miles from its mouth, where there is a ferry, the river is rapid and 100 yards wide.

**Nicopolis Bay.**—A little southward of the mouth of the Luro, a ridge of the range of hills N. of Nicopolis reaches the sea, and presents grassy cliffs with beach; then follows a long narrow spit projecting southward, and nearly covering Mazoma lagoon (which abounds in fish), leaving only a small opening. The ruins of Nicopolis are seen over the lake. Thence a precipitous and bold shore trends to the SSE.  $\frac{3}{4}$  E. about four miles to cape Skara.

**Port San Nikolo.**—From Prevesa strait, the low flat land continues to the southward bordered by rocks and shoal water, which extend some way off, the five-fathom line of soundings being in places a long mile from the shore. At the distance of two miles southward of Skilee point the low land becomes marshy and falls back to the eastward, forming a large bight about two miles deep, choked with rocks and shoal water, but leaving in the interior a circular space called port San Nikolo, three-quarters of a mile in diameter, with  $3\frac{1}{2}$  to four fathoms water, mud bottom, and excellent holding ground, but available only for small coasting craft and fishing boats, acquainted with the shallow passages through the reefs and shoals.

This bight is partly covered on its S. side by a long narrow spit of conglomerated rock called Plaka, which about a foot above water projects northward and near its termination trends eastward. This conglomerate formation is seen on Kavos Yero-tripa, the N. extreme of Santa Maura, whence it skirts the coast to the eastward and northward to the strait of Prevesa; in places it is broken, forming numerous rocks, and the islets of Doozinani, Achiloo, and Jefti; the two latter are awash, and on the N. side of entrance to the bight. This rock is used in the construction of moles and other works which are subjected to the wash of the sea.

At the head of port San Nikolo, between a sandy spit projecting S. from the low marshy land on the N., and a bluff point 60 feet high on the S., is the entrance into Chelovero harbor, a shallow area abounding in fish, particularly the picked dogfish (*Acanthias vulgaris*), which are found in great numbers in the surf along the Dooziuani, Achiloo, and Jefti reefs. The spikes of these fish are well known to the fishermen of Santa Maura as most formidable weapons. The shore N. of Chelovero harbor is sandy with off-lying rocks.

**Doozinani Islet and Beacon.**—Doozinani islet has on its N. end a beacon or obelisk, which is the basement of a light-house that existed to mark the S. side of the entrance to port San Nikolo. This islet lies 1,200 yards NNE.  $\frac{3}{4}$  E. from the Lazaretto on San Nikolo islet, which

lies within the Plaka spit. At 1,200 yards N. of Doozinani is Achiloo islet, and between the two is the entrance to port San Nikolo, with depths of two to three fathoms, but the channels in are tortuous and shallow, and not more than from six to eight feet deep.

From the shoulder of Plaka spit, where it trends eastward, a rocky reef extends 800 yards to the N., terminating in a ridge of huge boulders and rocks, which form the margin of the surf in strong NW. winds.

Vessels working in the vicinity of these dangers should not stand into less than eight fathoms water, and should keep mount Lamiah well open southward of the houses of the lazaretto on Sar Nikolo islet. A bearing of the light-tower on Santa Maura mole will also indicate a vessel's approach to these rocks.

The sea-breeze forces a considerable quantity of water into the bight, which at sunset, when the breeze dies away, rushes out with much strength.

**Demata Bay** is included between Skilu point and Kavos Yero-tripa (Windmill point); it has a depth of from six to 33 fathoms; bottom mud and sand. It is entirely open to the westward and affords only temporary anchorage for large vessels. The southern part of the bay is the roadstead off the entrance to the town of Santa Maura.

**SANTA MAURA.**—The island of Santa Maura (*Leucadia* of the ancients) is rather less than 19 miles in length, its extreme breadth eight miles, and the estimated area 180 square miles. A lofty limestone ridge stretches the whole length of the island, with several spurs or ridges extending to the eastward; the highest and most southern elevation, mount Stavrota with a double top, reaches 3,700 feet above the sea, and is conspicuous from the northward and westward. During winter the highest mountains are capped with snow.

Vegetation generally is good, but scanty near the summits of the heights. Several rich fertile plains are interspersed over the island, the chief of which extends W. and S. from the principal town; it produces a large crop of olives, the groves being exceedingly dense and extensive.

The climate is good, but along the NE. shore it is very unhealthful, intermittent fever prevailing during the summer months. Earthquakes are prevalent during the hot months, but are slight and scarcely perceptible; their frequency perhaps accounts for the rarity of any severe shock. The population, amounting to upwards of 25,000, are a hard-working, quiet, and hospitable people, husbandry being their chief occupation; a few are fishermen, and as a rule they are in favor of a seafaring life.

The principal productions are oil and wine, with a little wheat and

maize, and a large quantity of salt. Traces of quicksilver have been found near mount Stavrota.

The chief town, Santa Maura or Amaxiki, at the NE. end of the island, contains 15 churches and about 6,000 inhabitants. It is surrounded on three sides by an extensive shallow lagoon, and large salterns are in the neighborhood to the SE.

**Santa Maura Mole.**—The citadel or fortress, erected on the narrow strip of low ground which incloses the lagoon, and once capable of offering considerable resistance, is now dismantled and useless. It covers considerable ground, and shows evident signs of its numerous masters in the various materials, and in its construction and outworks. Within it is a Turkish mosque, which became later a Christian church, but is now used as a Government storehouse.

At about half a mile westward of the citadel, a well-constructed mole projects about 300 yards to the NE., covering a small area with shelter for small vessels from the NW.; along the mole are bollards for making fast, and by dropping an anchor to the northeastward a vessel can haul in and secure to it. Small coasting craft haul into the canal under the citadel. On the W. side of the citadel, between it and the mole, is a boat canal and a causeway leading to the town, distant about three-quarters of a mile.

During fine weather in summer, vessels will find temporary anchorage in eight fathoms water, a short half mile to the NNW.  $\frac{3}{4}$  W. of the lighthouse.

A large ship should anchor farther to the NW., in 12 to 15 fathoms. This anchorage is, however, exposed to N. and NW. winds, which send in a heavy sea.

**Winds.**—The land and sea breezes are very regular in summer; the former blow from about 10h. p. m., until 5h. a. m.; the latter set in about 10h. a. m. and cease about 7h. p. m., with calms during the intervals. Frequent thunder-storms occur, especially about the equinoxes, when heavy squalls may be expected from the hills and mountains.

**LIGHT.**—At the end of Santa Maura mole is a circular tower, which exhibits, at 54 feet above the sea, a *fixed* white light, visible nine miles.

**COAST.**—From the mole of Santa Maura to Kavos Yero-tripa, or Windmill point,  $1\frac{1}{2}$  miles westward, the shore is a shingle beach, which in most parts has become compact and solid. Kavos Yero-tripa is the N. extreme of Santa Maura island, and the NE. point of Flayva bay; the point is foul a quarter of a mile off, and should have a wide berth. Extending along the beach for about a mile S. of Yero-tripa are five windmills.

Cape Zuana, two miles to the SW. of Kavos Yero-tripa, is a bold

cliffy headland, and, excepting a few sunken rocks skirting the shore close in, is clear of danger. At  $3\frac{1}{2}$  miles S. of the cape, is a little bluff promontory forming an inlet open to the N., which in fine weather may be used by boats; thence the high coast continues southward, and at two miles beyond Sesola islet becomes broken and assumes a whitish appearance, to which the promontory it forms owes the ancient name of *Leukate*. The high land terminates in cape Dukato, eight miles southward of the islet.

The coast is skirted here and there with sunken rocks and some above water, at the distance of 200 yards. At two miles N. of cape Dukato is a remarkable triangular white cliff, 780 feet high, celebrated as the famous *Sappho's leap*.

**Sesola.**—This islet,  $9\frac{1}{2}$  miles from cape Zuana, is triangular in form, 400 yards in extent, 114 feet high, and perpendicular on its SW. and SE. sides, where many huge rocky fragments show above water close to. The islet slopes to the N., where it is foul for about 200 yards; is perforated at the S. end, and lies about  $1\frac{1}{2}$  miles from the coast, the water between being from 30 to 70 fathoms deep.

**Cape Dukato**, the S. extreme of Santa Maura, is bold and steep to, and a little E. of it is a small dark islet or rock; it is separated from the N. end of Cephalonia by a passage five miles wide. The current near the cape is often sensibly felt.

A little more than a mile SW.  $\frac{1}{2}$  S. from cape Dukato is a shoal, circular in form, half a mile in circumference, with a least depth of from 10 to 15 feet at low water. This shoal is directly in the track of vessels making a short turn around the cape, and great care should be taken to avoid it.

**Vasilico Bay.**—The promontory (ancient *Leukate*), which terminates in cape Dukato, forms the W. side of Vasilico bay, and is all along bold and steep to. The bay is about four miles deep, and affords excellent shelter; the best anchorage being off the center of the sandy beach at its head, in from 15 to 12 fathoms, sand; closer in, the water suddenly shoals from seven to two fathoms. A good berth will also be found about half a mile westward of the little mole on the E. side of the bay, in 10 fathoms, mud. The mole is at the village, and affords shelter to country boats during southerly winds, and occasionally a light is shown from a pillar erected on the mole head for that purpose.

There is a watering place formed by a spring which turns a small mill near the sea, about a quarter of a mile S. of the mole; a plentiful supply may be obtained by leading a hose into the boat. A small stream runs through the valley into the sea at its head. The bay terminates on the E. in Lipso point, nearly five miles from cape Dukato.

**Coast.**—From Lipso point to the S. extreme of mount Porro, which lies NE. by E.  $\frac{1}{2}$  E., the distance is about  $4\frac{1}{2}$  miles; the coast between is irregular, high, and bold, and forms the three bays of *Aphteli*, *Sivota* and *Ruda*. *Sivota* has good shelter for coasting vessels, in the other two the water is too deep for anchorage. Mount Porro, 1,670 feet above the sea, which rises over the head of Ruda bay, is  $1\frac{1}{2}$  miles from its southern termination. The high and bold coast now turns to the N., and forms, with Meganisi island, the narrow deep channel of this name.

**Arkudi island** is separated from Lipso point to the NW. by a passage  $2\frac{1}{2}$  miles wide, and from the N. end of Ithaca by a passage three miles wide. Arkudi is nearly two miles in length N. and S., a mile in breadth, 441 feet high on its western side, the eastern part being flat. Its shores are rocky and steep-to, but a sunken rock is said to lie about 400 yards off its SE. point. The island affords pasturage for a few sheep and goats.

**Caution.**—Her Majesty's ship *Bellerophon*, in 1869, when rounding the S. end of Arkudi, was supposed to have grazed a rock about SE.  $\frac{1}{4}$  S., distant 400 yards from the S. point of the island. Although a subsequent search for the rock was fruitless, mariners are cautioned not to approach too close to the salient points of the islands and coast in this sea.

**Meganisi.**—This island is very irregular in form, the main portion extending  $3\frac{1}{2}$  miles ENE.  $\frac{1}{4}$  E. and WSW.  $\frac{1}{2}$  W., and it averages nearly two miles in breadth, but at the SW. end a long narrow strip of land, projecting nearly four miles to the SE., terminates in cape Kephali, and forms with the main portion of the island a deep bight with its extreme points to the eastward; the shores of this bight are everywhere bold and the water deep. The island is hilly, and the valleys between are cultivated; the hills range from 200 feet high at its NE. part, to 874 feet high at the SW. part, and the elevation of the middle of the long projection is 289 feet.

On the N. and NE. sides of the island are several deep inlets, with accommodation for coasting vessels. The two chief places are the ports of *Spiglia* and *Vathy*, with the villages of *Spartokori* and *Vathy* at their heads; another village is on the SE. side of the island. There are about 1,000 inhabitants, who are generally poor. Water is scarce.

Two islets or rocks lie off the central point, on the NE. side of the island, and are connected to it by reefs; a sunken rock lies close to the shore of Elia point SE. of the former, but the coast elsewhere has no outlying dangers.

**Kithro Island** is a mile in length, its extreme breadth about 800 yards, and its height 300 feet; its coast is irregular, steep, and sur-



rounded by a bank, which extends off a quarter of a mile around its W. point, where there are from five to 17 fathoms water. A small quantity of corn is grown on the island. The island forms, with the SW. side of cape Kephali, a narrow channel, with from 30 to 50 fathoms in the middle.

Petallis, three-quarters of a mile to the NW. of Kithro island, is a barren rock eight feet above the water, and about 200 yards in diameter; it is surrounded by a rocky bank with from six to 17 fathoms on it, outside of which the water is deep.

**Meganisi Channel**, between the island of this name and Santa Maura, is half a mile wide, and the water deep. The cliffy coast of Meganisi, in the narrowest part of the channel, is followed by a low shore bordered by a bank, on the S. part of which, at nearly 200 yards from the shore, there are only  $2\frac{1}{2}$  fathoms water. On the bank, three quarters of a mile to the N., is Tiglia islet, 30 feet high, and its northern part only about 200 yards from the shore; its S. point is foul 200 yards off, and the shoal water continues along its eastern side. There is anchorage for small vessels between the islet and Meganisi, in from 10 to 12 fathoms water, sandy bottom. The channel through to the N. carries 19 fathoms, past the foot of One tree hill, which is 521 feet high, at the NW. end of Meganisi. The shore of Santa Maura is high, bold, and clear of danger.

**Port Vliko**.—This little port is nearly oval in shape, being over a mile in length N. and S., and half a mile in breadth; it is bordered all round by a bank, which at its head, where the ground is marshy, extends off very shoal for a quarter of a mile, leaving in the center of the port  $3\frac{1}{2}$  and four fathoms water, mud bottom. It is surrounded by high land, which, with the marshy ground, confined position, and sheltered from all winds, cause fevers during the summer months. In the SW. part are some houses, a custom-house and health-office, but few inhabitants.

The entrance to the port, five miles N. of the S. extreme of mount Porro, is through a narrow channel about three-quarters of a mile in length, four fathoms being the least water; at the inner part of the channel keep a little on the eastern side.

**Skropio Island** is about two miles in circumference, hilly, and 186 feet high; its shores are irregular, and shoal water surrounds the NW. point. The islet of Sokava, with rocks extending N. and S. of it, lying off the W. side of Skropio, rises from a bank which surrounds the island, excepting its E. end. Between the islet and coast of Santa Maura, the channel in continuation of that of Maganisi is nearly half a mile wide, with 35 and 40 fathoms water.

On the N. side of Skropio, a long 200 yards from its NW. extreme,

and in front of a bay, is the smaller island of Skropidi, with 10 fathoms water between.

**Hieromiti Shoals** are three rocky patches lying nearly midway between Skropio island and the entrance to port Vathi in Maganisi island; the two patches nearest to Skropio have three feet water on them, are about 200 yards apart, and each distant about half a mile from Kastri point, bearing from it respectively, nearly E. by S. and ESE.  $\frac{1}{4}$  E.; the third patch, with two fathoms water on it, is a third of a mile from the other two, and nearer port Vathi, being 1,200 yards from its NE. point of entrance, and bearing WNW.  $\frac{1}{4}$  W. from Macria point of Maganisi. These dangers are steep-to.

One tree hill, at the point of Meganisi peak, with a single tree on it, bearing SW.  $\frac{1}{4}$  W., and in range with the southern shoulder or fall of mount Porro, leads to the SE. of Hieromiti shoal.

**Sparti Island**, N. of Skropio, and half a mile from the shore of Santa Maura, is three-quarters of a mile in length NE. and SE., 100 feet high, bold and steep-to on its SE. side, but a bank extends a quarter of a mile westward from its S. end, and on it is a rocky patch with  $1\frac{1}{2}$  fathoms, and deep water close-to it.

Between the SE. end of Sparti and the entrance to port Vliko, is the little round island of Moodra, about 400 yards in diameter and 80 feet high. The passage into port Vliko is either N. or S. of this latter island. The rock or islet of Socava, 50 feet high, lies a third of a mile N. of Moodra, and nearly 300 yards from the shore of Santa Maura; the passage between this islet, and the  $1\frac{1}{2}$  fathoms patch off Sparti island, is 600 yards wide.

From port Vliko northward the coast is bordered by a bank, which in places is shoal 300 yards off, and Mara point and coast beyond it is skirted with rocks.

**Port Drepano**, formed between Santa Maura and the mainland, is three miles deep, with an average breadth of  $1\frac{1}{2}$  miles. The anchorage at its head is in from 12 to seven fathoms water, good holding ground, and SW. of the white fort St. Giorgio, which stands on a hill on the mainland, and is 150 feet high. A small rocky white islet lies at the base of the hill, from which a sunken mole extends westward; on the opposite or Santa Maura side the remains of an ancient mole projects eastward; at the extremity of each mole is a small black buoy, marking the channel into an inner anchorage.

The inner anchorage is used by small vessels, which load with salt from the extensive salterns in the vicinity. The channel in has four and three fathoms water, and there are three and two fathoms inside. From the interior of the inner anchorage, a narrow boat canal, with three

feet water, leads to Santa Maura mole on the N. A good road leads to the capital of Santa Maura, where there is an electric telegraph. A steam vessels calls here from Patras weekly.

**Kephali Point**, the SE. extreme of port Drepano, is 35 feet high, bold, projecting, and skirted by rocks; it is  $2\frac{3}{4}$  miles SSE.  $\frac{3}{4}$  E. of the white islet under fort St. Giorgio, and the coast between is high and covered with brushwood. Kephali point is the SW. termination of mount Saussi, which at  $3\frac{1}{2}$  miles inland rises 1,650 feet above the sea. At a long half mile eastward of the point is a narrow inlet, called Vathi Vali bay, open to the SW., and about half a mile deep, shoaling from 16 fathoms water at the entrance to three fathoms two-thirds the distance in.

**Sunken rock**.—There is a sunken rock lying about 150 yards from the shore, eastward of Aspro Yali bay, eastern side of entrance to port Drepano.

This rock (*Miasulis rock*), with six feet over it, and six to eight fathoms around, lies on the following bearings:

Western entrance point Vathi Vali bay.....	E. 300 yards.
Point Kephali.....	NW. by W. $\frac{1}{2}$ W., 650 yards.

At 1,200 yards eastward of the projecting E. point of Vathi Vali bay is the islet of St. Nicolo, about 400 yards in circumference and 67 feet high, with a chapel on it; the islet is surrounded by a bank, which on its SW. side extends 200 yards off, with six fathoms water on it. To the NE. of the islet is Varcos bay, with cultivated land and a beach at its head, off which, in the NE. corner, small vessels anchor in about five fathoms water, sheltered from the SE. by the projecting E. point.

**Zaverda Bay**.—Cape Varcos forms the W. extreme of Zaverda bay, which is  $3\frac{1}{2}$  miles wide at the entrance and  $2\frac{1}{2}$  miles deep, extending in a northerly direction. About three-quarters of a mile to the NE. of Cape Varcos, and near the shore, are some rocks or islets, called Poghonia

The shore at the head of the bay is an extensive beach, and the water shoals some distance off all round the bay, especially in the NW. part. The cultivated valley or plain in its rear extends N. to Vonitza in the gulf of Arta.

The village of Zaverda is near the shore on the E. side at the head of the bay, and behind it on an elevated plain are several houses with gardens. The anchorage is off the beach to the NW. of the village, in 10 fathoms water, mud. A steam vessel calls here weekly from Santa Maura and Patras.

The coast from the village of Zaverda trends southward nearly straight to cape Kamilafka, a distance of seven miles; the first part is bordered

by a narrow bank, and it is then steep-to. The land between rises in steep limestone ridges to mount Kandili, which at  $1\frac{1}{2}$  miles inland is 3,165 feet above the sea, and decends gradually to the cape. Cape Kamilafka is steep-to, and on its E. side is a sandy bay, where vessels anchor in eight to 10 fathoms, sand.

**Vurko Bay.**—Mytika point, the W. extreme of Vurko bay, is low, sandy, and steep-to, and on it is the village of the same name, consisting of two rows of houses and a few huts; the inhabitants are poor. Vurko bay extends eastward two miles, with a sandy beach bordered by a bank, from which the water deepens suddenly, and behind it, together with the bay on the E. side of cape Kamilafka, is a cultivated plain. Mytika has regular steam communication with Patras.

The bay affords excellent anchorage in about 12 fathoms water, sand, at a half or three-quarters of a mile eastward of Mytika point, with the E. extremes of Kalomo and Dragonara islands in range, or the E. extreme of the latter a little open E. of the former, and sheltered from the SW. by Kalomo island.

The passage between Mytika point and the N. end of Kalomo island is about two-thirds of a mile wide, and from 14 to 25 fathoms deep. With the wind from the westward, unless strong, it will not reach the anchorage, but veers round Kalomo island from the SE. A weak current sets eastward.

**Kalomo Island** is six miles in length, in a NE. and SW. direction, with an extreme breadth of  $2\frac{1}{4}$  miles; but at  $1\frac{3}{4}$  miles from the S. end it is nearly divided into two by a narrow neck, the northern portion being somewhat oval in shape, and through which a mountainous ridge extends along its whole length, reaching near the middle, 1,958 feet above the sea. The southern portion is of far less elevation being only 654 feet high near the S. extreme. Its coast is bold and steep-to all round, except a three-fathom patch, close to its NW. elbow, and another five-fathom patch farther eastward.

The island is cultivated, and produces excellent wine. The town of Kalomo is on the E. side of the island, where a mole with three fathoms water within it, affords accommodation for small vessels. There is anchorage to the NE. of the mole, in eight or nine fathoms, 800 yards from the beach. Heavy squalls, even in summer, blow from the high land in the neighborhood, and a good scope of cable is necessary.

The NE. end of Kalomo island is separated from the coast E. of it by a passage nearly  $1\frac{1}{2}$  miles wide, but the passage is narrowed by a group of rocks about five feet above water, extending about a third of a mile from the mainland; between these rocks and Kalomo the water is deep.

**Kastus Island** is narrow and straight, with an irregular coast, four miles in length, at its N. end 350 feet high, wooded and cultivated. There is a small village on it, but few inhabitants. On its W. side is an inlet, about 600 yards deep, open to the N., with a rock above water near the middle of the entrance, within which small coasters anchor in three fathoms water. To the E. of the entrance is a mill.

An islet 18 feet high lies close off the middle of the E. side; and another, named Provati, 133 feet high, about 300 yards off the N. end, with deep water between; this latter islet is about 800 yards from the nearest part of Kalomo island, and in the passage thus formed there are from five to 18 fathoms water.

**Formicula Islet and Shoal**.—At a mile nearly to the SE of the S. end of Kalomo island is the islet of Formicula, only 25 feet high, nearly 800 yards in length, and with 30 fathoms water midway in the channel between. A large rock above water lies off the SE. point of the islet, and another close to its NE. point.

At rather more than three-quarters of a mile from the nearest part of Kalomo island, W.  $\frac{1}{4}$  N. from its S. extreme, and N. by W.  $\frac{3}{4}$  W. two-thirds of a mile from the NE. extreme of Formicula islet, is the shoal of this latter name, about a quarter of a mile in length in a NE. and SW. direction, and 100 yards in breadth, with two fathoms water on it, bottom rocks, sand, and shells; at a quarter of a mile to the SW. by W.  $\frac{1}{4}$  W. of it, is another rocky patch, with five fathoms on it and steep to.

The mill on Kastus island in range with the S. extreme of Kalomo island leads N. of the shoals; and the SW. end of Oxia island, open eastward of Formicula islet, leads westward of them. Cape Kapri, the E. extreme of Cephallonia, in range with the E. extreme of Atoko island, also leads westward of these shoals.

**Atoko Island** is triangular in form, two miles in length NE. and SW.,  $1\frac{1}{4}$  miles in extreme breadth, which is to the SW., and where one of its three peaks reaches 998 feet high; it is covered with brushwood, partially cultivated, and a few sheep and goats find on it excellent pasturage. On the SE. side is a bay, where there is a well of fresh water, and a small church. Quantities of broken coral are found on the beach. The island is steep all round, nearly five miles from Arkudi, four miles from Kustus, and  $3\frac{1}{2}$  miles from Formicula islet.

**Cape Marathia**.—From the E. end of Varko bay the coast trends southward for 10 miles, to cape Marathia; with the exception of the rocks before mentioned under the head of Kalomo island and the last paragraph, the coast is in general steep-to, the land thickly wooded with wild olive trees and the valonia oak, and backed by high mountainous

land. Cape Marathia is 480 feet high, steep-to, and  $2\frac{1}{2}$  miles N. of it is mount Veloutzi, 2,432 feet high.

**Dragamesti Bay.**—This bay is about  $2\frac{1}{2}$  miles deep, and  $1\frac{3}{4}$  miles wide at the entrance, narrowing within to about a mile; its shores are bold and the water deep, except off the sandy beach at the head. In the NW. corner of the bay is the thriving little village of Astoko, near which vessels anchor in nine and 10 fathoms water, and load with valonia, which is gathered in large quantities on the surrounding hills. The town of Dragamesti is some distance up the valley, which is well cultivated. Astoko has steam communication with Patras.

**Supplies.**—Fresh meat and vegetables can be obtained here at certain seasons, and good water in a small bay at the SW. end of the village.

**ECHINADES ISLANDS.**—This group consists of 16 small islands, islets, and rocks, off the entrance of Dragamesti bay, sheltering it from the SW.; they lie over a space of  $4\frac{1}{2}$  miles N. and S., and about five miles E. and W., and are in part cultivated, and the larger islands afford excellent pasturage. They are in general steep-to, but small vessels navigating among them should be guided by the chart.

**Prasa**, the westernmost of the group, is a mere rock 200 yards in diameter, and surrounded by a narrow bank, which is steep-to; it is  $1\frac{1}{2}$  miles from Lambrino island, and at night should be carefully avoided.

**Dragonara Island**, the largest of the group, is  $1\frac{1}{2}$  miles in length, 450 feet high, with an irregular coast and steep-to. It is cultivated with olive trees, and at its NW. end is a small inlet fit only for boats. The island is a short mile from cape Marathia, and with Kaloyero islet forms the S. side of the entrance of the N. passage to Dragamesti bay.

Kaloyero islet, 132 feet high, is about 800 yards in extent, and separated from the NE. side of Dragonara by a narrow channel, seven fathoms deep; both points at the E. entrance are foul. The channel between this islet and cape Marathia is 800 yards wide, with 18 to 37 fathoms water.

On the W. and SW. of Dragonara are the islets of Lambrino, 184 feet high; Sophia, 245 feet high; and Pistro, 158 feet high; this latter is foul, except on its SW. side, with a smaller islet and a rock to the N. of it.

**Kalonisi and Pondiko Islets.**—Kalonisi islet is nearly round, about half a mile in diameter, 270 feet high, and lies about 600 yards eastward of Dragonara.

Provati island is a mile in length, cultivated, and separated from Kalonisi by a pass only 200 yards wide.

On the W. side of Provati, distant about 400 yards, is Chakolonisi

this islet is about a quarter of a mile N. and S., 80 feet high, with two hills, one to the N. and the other to the S. Chakolonisi is half a mile southward of Dragonara island, and under favorable circumstances the passage between is convenient for small vessels bound to Dragamesti bay.

Pondiko islet, two-thirds of a mile in extent, with two hills, and cultivated, is 800 yards to the SE. of Provati; the NE. point of the islet is foul 200 yards off, which narrows the passage between the two. Pondiko is a mile to the SW. of the entrance to port Platea.

In the passage between Pondiko islet and the mainland and nearly midway, is a shoal with three fathoms water on it. To avoid it, keep near the islet, or bring Snipe point NW. of port Platea, in range with mount Velontzi, which will lead westward of the shoal. Shag rock in range with the E. end of Kunelli islet, also leads westward of the shoal.

**Shag and Wreck Rocks.**—Shag rock, three feet above water, lies a third of a mile to the NW. of the N. point of Petala island, and is steep-to.

Wreck rock, a mile WSW. of the S. end of Pondiko islet, is about three feet above water, and resembles the hull of a vessel.

**Southern Group.**—This group consists of the four islets, forming a chain about  $1\frac{1}{2}$  miles N. and S., separated from each other at short distances, and steep-to. Carlo, the northern and smallest, is rather less than  $1\frac{1}{2}$  miles to the SW. of Provati island; Stamothei, the southern and largest of the group, is triangular in form, with a high hill, cultivated, and nearly three miles to the NE. of Vromona island. Vromona is 540 feet high, and from the SW. serves as an object of general recognition.

**PORT PLATEA.**—To the southward of Dragamesti bay and fronted to the westward by the Echinades islands, is the snug and almost land-locked port of Platea, open to the SW., about a third of a mile wide at the entrance, and three-quarters of a mile deep; it is surrounded with thickly wooded undulating hills, and is the most sheltered anchorage along this part of the coast, with depths of nine to 12 fathoms, mud bottom and excellent holding ground. There is no village or fresh water, and therefore the bay but little used. Red deer are found in the woods, and  $1\frac{1}{2}$  miles inland is the lake Platea.

**Port Pandelemona.**—To the N. of port Platea, and separated by a promontory a mile in breadth, is port Pandelemona, an inlet about 400 yards wide, and three-quarters of a mile deep, with from seven to nine fathoms water. At its head is a sandy beach and storehouses for valonia, for which vessels visit the port. Water is obtained in small quan-

ties from a well in the valley. A fine Hellenic fortress crowns the summit of a rounded hill at its head overlooking the port.

**Port Petala.**—Following port Platea to the S. is an extensive but shoal bay, the low shore being broken and submerged into marshy land and lagoons, and parts which are dry in summer are flooded during winter.

The island of Petala is  $2\frac{3}{4}$  miles in length, 855 feet high in the middle, rocky, barren, and separated from the flats and marshes of the mainland by a narrow channel sufficient only to admit a boat to pass through. The W. coast of the island is irregular, steep and rocky, and off its N. end is the Shag rock; and beyond it to the NE. the three fathom shoal, mentioned in the last page.

Port Petala is nearly land-locked, of considerable extent, shoal and filling up by the deposit from the overflow of the river Aspro Potamo during rainy seasons. The entrance to the port is about 600 yards wide, and formed by the southern part of Petala island, and the N. end of a narrow peninsula, about  $1\frac{1}{2}$  miles in length, having three hills, the middle of which is 302 feet high. It is covered with brushwood, and though once separate is now joined to the mainland by a narrow sandy isthmus.

The port, being near the entrance to the gulf of Patras, is the refuge of merchant vessels, when meeting strong southwesterly gales near Cephalonia and Zante; also, during the heavy NE. winds down the gulf of Patras in the winter season.

Vessels usually anchor on the NW. side of the port, immediately under the high land of Petala island, in three fathoms water, stiff mud. The water all round, but more especially towards the E. and southern shores, shoaling suddenly to two and  $1\frac{1}{2}$  fathoms, greatly contracts the anchorage.

Large herds of pigs are reared in the neighboring forests, and at certain seasons are exported to Malta. No water or provisions of any kind are to be obtained at this anchorage.

**Aspro Potamo** or White river (ancient *Achelous*), runs into the sea, after a tortuous course through the extensive plain, between the peninsula on the S. side of entrance to port Petala and the base of mount Kutzulari. It averages 100 yards in breadth for 30 miles from its mouth, with from  $1\frac{1}{2}$  to four fathoms water, but with only about two feet on the bar. The Aspro Potamo is the largest river in Greece, and flowing from a high mountain range, in the winter becomes swollen, inundates the whole plain near the sea, and brings down a large quantity of deposit. The sea breaks on the bar with SW. winds, the water being shoal three-quarters of a mile off, but deepens suddenly. At times the sea is discolored nearly two miles from the shore.



**Vromona and Makri Islands.**—Vromona island is nearly oval, rather more than three-quarters of a mile N. and S., 540 feet high, with two hills, which seen from the northeastward, form a saddle. The island is cultivated, and lies nearly three miles southward of Stamothi.

Makri island is a mile eastward of Vromona, two miles in length, NW. and SE., its greatest breadth being about 600 yards; it is 416 feet high, and cultivated. At about 200 yards E. of its SE. end is Kunelli, a steep rocky islet 100 feet high, and about a third of a mile in length. The water around these islands is deep and they may be approached to within a prudent distance.

**Oxia Island** is nearly  $2\frac{1}{2}$  miles in length N. and S., of an irregular form, being contracted in the middle to an isthmus with a bay on either side, one open to the NW., the other to the SE. The island is easily recognized by its precipitous rugged appearance, and when first seen appears separated into two parts, the northern portion being far the higher, forming a peak 1,410 feet above the sea, and nearly the same height as mount Kutzulari on the mainland, two miles to the NE. On the N. side of the island is a little bay, a third of a mile deep, with a beach, and anchorage for small craft in 11 fathoms water. Oxia island is steep to all round, and separated from the mainland by a deep channel a long half mile wide; it is inhabited by shepherds only. The peak of Oxia island, with mount Kutzulari, form excellent marks for the gulf of Patras.

**CEPHALONIA** (ancient *Kephallena*), the largest of the Ionian islands, is 28 miles in length in a northwesterly and southeasterly direction, with a varying breadth from about  $2\frac{1}{2}$  to 19 miles, being irregular in form and indented with bays. It is mountainous and a calcareous ridge traverses nearly the whole length of the island; the highest elevation is that at the SE. end, anciently called mount *Ænos*, the mount Nero, of what is now called the Black mountains, and which is 5,218 feet above the sea.

The summit of this mountain was formerly covered with a fine forest of pine trees, portions of which still remain, but the greater part was willfully burnt by the natives many years ago. A temple dedicated to Jupiter once crowned the summit, but not a vestige now remains. In continuation of the mountainous ridge to the NW. and N., the heights range from 2,174 to 3,212 feet high.

The principal productions are currants, oil, wine, and melons; the latter are celebrated for their size and flavor, frequently keeping good for a long time. Provisions are plentiful; only a few sheep and goats are reared on the island, owing to the scarcity of food; the cultivation

of the vine is carried almost to the summits of the mountains. Cattle are brought from the mainland.

The climate in general is very fine, but intermittent fevers are prevalent in the low lands near Samos, on the E. side of the island, during summer. There are 78 towns and villages on the island, and the population is about 78,500.

**Cape Vlioti**, the N. point of Cephalonia, is distant five miles from cape Dukato, the S. extreme of Santa Maura. The high land at the N. end of the island terminates in cape Vlioti, which is low, cliffy, and steep-to, with a rocky shore.

**Phiscardo Bay** is a small indentation about two miles to the SE. of cape Vlioti, and takes its name from one of the early queens of Cephalonia. The bay is about 600 yards deep to the NNW., and 200 yards wide in the narrowest part abreast the custom-house; it affords shelter to small vessels under 80 tons. The usual anchorage is at the head of the bay, in from two to four fathoms water, though in the narrowest part there are six fathoms. The village consists of a church and about 35 houses, inhabited entirely by seafaring men, to whom the patches of cultivated land around belong. Vessels, with a W. or NW. gale, will find shelter in about 14 fathoms water, with the light-house bearing N.  $\frac{1}{4}$  E. distant 300 yards.

Phiscardo is a small harbor completely sheltered from all winds, with good anchorage, muddy bottom. A point projecting on the W. side divides the harbor into two, an outer and inner. A vessel moored in the inner harbor, in nine to seven fathoms, has but little room to spare. There is room for a large ship to moor in the outer harbor, in 11 or 12 fathoms water. The village is on the W. side; a few vessels call here for cargoes of currants, about a million and a half pounds of which are exported annually.

**LIGHT.**—On the N. point of entrance to Phiscardo bay and 30 yards from the extremity, is a round yellow tower with a red lantern. The tower exhibits, at 60 feet above the sea, a *fixed* white light, visible eight miles. The light is seen in Ithaca channel to the southward, and becomes visible from the northward when bearing westward of about S.  $\frac{1}{4}$  W. The tower is also conspicuous from the S. and marks the entrance to the bay.

**Ithaca Channel.**—From cape Vlioti, the E. coast of Cephalonia trends to the SE. for two miles to Phiscardo bay, thence southerly nine miles to Agriossiko bluff; nearly the whole distance it is irregular, with several little coves of no importance but for boats to receive and discharge cargoes of fruit and corn. The coast trends nearly parallel with that of Ithaca, from which it is distant from about  $1\frac{1}{2}$  to  $2\frac{1}{2}$  miles, form-

ing Ithaca channel, with from 80 to 95 fathoms water in the middle. Agriossiko bluff is the termination of a spur of the high mountain range immediately over it, and is composed of conspicuous steep white cliffs.

**Deskalis Islet**, lying 800 yards from the coast of Cephalonia, and nearly two miles southward of Phiscardo light-house, is about 200 yards in length, flat, low (10 feet high), and of a reddish color, with the ruins of an old tower on it. Shoal water extends a little N. and S. of it. To avoid the islet at night, keep Phiscardo light a little westward of NW.  $\frac{3}{4}$  N.

**Pilaros Cove**.—This cove,  $1\frac{1}{2}$  miles to the SW. of Agriossiko bluff, is a quarter of a mile deep, and 300 yards wide; it affords anchorage for coasting vessels in from eight to two fathoms, the water shoaling gradually to its head. The cove is rarely visited in the winter, being exposed to winds from NE. to SE., which send in a heavy swell. Violent squalls also blow down the deep valley, extending westward from the cove.

The village is small and rudely built, comprising only about 45 houses; the principal feature being a church, said to be the finest in the seven islands. Business is carried on here during the summer months by local traders transmitting their goods across the island to Argostoli by the route from this place, in preference to the more mountainous road from Samos, the town of which is  $3\frac{1}{2}$  miles to the SE.

**SAMOS BAY**.—This bay, between cape Dekalia on the E. and the opposite shore on the W., is  $2\frac{1}{2}$  miles across, and  $1\frac{1}{2}$  miles deep. It is semicircular, sheltered from all winds but those from the N., and even with the wind from that quarter no sea could rise to cause alarm, the holding ground at its head being good, mud and sand. Vessels may anchor in from 12 to 15 fathoms; a good berth for a small vessel is in 12 to 13 fathoms, with the largest house in the village bearing about SE.  $\frac{3}{4}$  E., distant half a mile; and the extreme of cape Dekalia NE. Large ships should anchor farther out. A small mole projects in a westerly direction into two fathoms water, from near the large house, and is used by small craft. During strong winds it is necessary to be prepared for the heavy squalls which blow from the high land.

The village is in the SE. angle of the bay, and is small and straggling. On the summit of a hill to the eastward are the ruins of the ancient city of Samos, and the remains of fine Hellenic walls are still to be seen in excellent preservation. An extensive plain, richly cultivated and well watered, extends southward from the head of the bay.

**Cape Dekalia**, the termination of the land bounding the E. side of Samos bay, is a bold bare rocky headland, easily recognized by a small remarkable peak over it, partially covered with bushes, which is 525 feet

high. The cape forms, with St. Andrea point the S. extreme of Ithaca, the S. entrance of Ithaca channel, which is nearly two miles wide, with bold shores on either side and deep water.

Directly to the eastward of the cape is Anti Samos bay, about three-quarters of a mile deep, but of no importance. A vessel might anchor in this bay, in 10 or 12 fathoms water, about 400 yards from the beach at its head, but as it is open to the NE., from which heavy squalls at times prevail, it can only be used as a stopping place during summer.

**COAST.**—Agrilious point, SE. of the above bay, and  $1\frac{1}{2}$  miles from cape Dekalia, is steep and rocky, with a round knob on it; Grosso point,  $1\frac{1}{2}$  miles farther S., is a steep perpendicular rocky cliff, rising abruptly from the sea 100 to 130 feet high, and is remarkable; the coast thence to Pronos bay, a distance of five miles, is nearly straight. Pronos bay is nearly  $1\frac{1}{2}$  miles wide, and a quarter of a mile deep, the shore being mostly shingle. Small country vessels anchor occasionally in the S. extreme of the bay where there is a little mole, but with an easterly wind a sea rolls in.

In the southern part of Pronos bay is a remarkable gorge, 300 to 400 feet high, the outlet during the winter season for the mountain torrents, which empty into the bay. The shore for more than a mile SE. of Pronos bay is rocky, when it becomes steep and clear to cape Kapri, a little farther on. Cape Kapri, the E. extreme of Cephalonia, is bold and steep-to; a sharp-topped hill 543 feet high, and partially covered with stunted trees, rises immediately over it.

**CAPE MONDA**,  $3\frac{1}{2}$  miles southward of cape Kapri, is the S. extreme of Cephalonia, and forms a remarkable bold bluff 100 feet high, its face is a steep clay cliff, and the land a mile N. of it low and cultivated.

**Kakova Shoal.**—The E. coast from  $1\frac{1}{2}$  miles N. of cape Monda is bordered by a shoal bank which surrounds the cape and shore to the westward, and projects nearly  $1\frac{1}{2}$  miles in a southeasterly direction, terminating in a depth of four fathoms. At about 200 yards outside this depth, a black buoy is supposed to be moored in seven fathoms water. Although between the shore and the extremity of the shoal, two fathoms is the least water marked on the chart, the passage over the shoal should not be taken, the bottom being rocky and irregular.

The W. extreme of Atoko island, open of cape Kapri leads eastward of the shoal; and St. Giorgios castle, open southward of Koroni bluff, leads well to the southward of the shoal.

**COAST.**—Between cape Monda and cape Cataleo, nearly two miles westward, the coast forms a bay two-thirds of a mile deep, with a sandy shore bordered by rocks and shoal water. Small craft can anchor off the little village in the NW. corner. A heavy westerly swell frequently

sets into the bay, and sailing vessels should not stand too close in. From cape Cataleo to Koroni bluff,  $2\frac{1}{2}$  miles farther westward, the coast cliffs are from 250 to 300 feet high, bold and precipitous, showing remarkably white from seaward, and skirted by sunken rocks.

Between Koroni bluff and cape Liakas, which are six miles apart, is Loortha bay, two miles deep to the N.; the coast is steep cliffy points, followed by a sandy beach  $1\frac{3}{4}$  miles in extent, thence the general features are white clay cliffs from 50 to 100 feet high, for  $2\frac{1}{2}$  miles to cape Liakas, which is a low shelving sandstone point rising gradually to the cultivated land within it; the cape is surrounded at the distance of about 200 yards by detached sunken rocks. With all winds southward of E. and W., a heavy swell sets into the bay, accompanied with a surf on the beach. With northerly and easterly winds very heavy squalls blow down from the Black mountains, which rise immediately over it.

**Danisti rock** lies nearly half a mile S. by W.  $\frac{3}{4}$  W. from cape Liakas; it is eight to 10 feet above the sea, with a bare white appearance, and the sea generally breaks heavily over it. There are from seven to three fathoms water within the rock, but vessels should not pass between it and the shore, as the bottom is irregular.

**Thio-nisi**.—Between cape Liakas and Pelagia point, two miles to the WNW., the shore is low and forms a bay filled with rocky patches and shoal water; these patches have from one to two fathoms on them, with deep water between. At half a mile from the shore, and  $1\frac{1}{2}$  miles W. of cape Liakas, and nearly the same distance from the Danisti rock, is Thio-nisi, which will be readily known from its steep white appearance, about 200 yards in diameter, 80 feet high, with a monastery on its summit. It stands up as an excellent mark, especially for those dangers between it and the coast. Although the islet is steep-to, when in its vicinity to the westward, vessels should keep it bearing to the northward of E., so as to avoid the tail of the reef extending from Pelagia point.

The coast from Pelagia point to San Nikolo islet is low and fringed with rocks and a narrow bank..

**PORT ARGOSTOLI**.—The outer entrance to port Argostoli is between San Nikolo islet, on the E., and Guardiania island, on the W., which are more than  $2\frac{1}{2}$  miles apart. At about two miles farther in are the two points of Lathico and St. Giorgio, the former on the E., and the latter on the W.; thence a deep inlet, averaging  $1\frac{1}{2}$  miles wide, extends  $7\frac{1}{2}$  miles to the N., the upper part being called Livathi bay. From the depth of 20 fathoms at the entrance, the water gradually shoals to four fathoms at about half a mile from its head.

**San Nikolo Islet**, on the E. side of entrance to port Argostoli, is

300 yards in length, 206 feet high, and rather more than 200 yards from the low point within it, and on which is a tower; the islet and point are surrounded by rocks and shoal water, which extend more than 300 yards westward of the former. The village of Mignia is to the NE. of the point, with olive trees to the S. of it, and among the trees is a large monastery very remarkable for its beauty.

Between San Nikolo islet and Lathico point, the shore forms a bay, everywhere skirted by rocks extending some distance off; in the middle of the bay are conspicuous white cliffs. Vessels should avoid standing too far into the bay, especially near its extremes.

The light-house on San Theodoro point, bearing eastward of N.  $\frac{1}{4}$  W. and well open of Lathico point, leads westward of the dangers off San Nikolo islet.

About a mile NW.  $\frac{3}{4}$  N. from the island is San Nikolo bank, with from seven to 10 fathoms of water on it, and half a mile W. of the island is a bank with nine and 10 fathoms; between the banks is a depth of 13 fathoms.

**Guardiana Island.**—This island is 1,300 yards in extent in a NW. and SE. direction, 118 feet high, surrounded by rocks and shoal water, which extend southward 600 yards, and westward nearly half a mile; on the SE. end of the island, which is the lowest part, is a conspicuous white stone circular light-tower.

The N. end of the island lies  $1\frac{1}{4}$  miles from the shore and equidistant between St. Giorgio point on the E. and Akroteri point on the W.

These two points are  $2\frac{1}{2}$  miles apart, and the western portion of the coast between is bordered by scattered reefs and rocky patches extending southward nearly half a mile.

**Akroteri Shoals.**—Akroteri point is very low and is the termination on the S. of the high land forming the W. extreme of Cephalonia; the point has a watch-tower on it, and is surrounded by rocks and shoal water, in continuation of the rocky patches from the eastward, and which project a long mile to the southward. The outer of these rocky patches, with  $3\frac{1}{2}$  and four fathoms water on them, and on which the sea breaks, are called Akroteri shoals.

The right or highest hill of mount St. Sidaro, kept well open westward of the watch-tower on Skisa point and bearing northward of NNW.  $\frac{3}{4}$  W., leads westward of the Akroteri shoals. The belfry of Mignia monastery seen in the olive grove, bearing E., and in range with a windmill on the ridge at the back, leads southward of the shoals and all dangers around Guardiana island.

**LIGHT.**—The light-tower on Guardiana island exhibits, at 123 feet above the sea, a *fixed* white light, visible from a distance of 12 miles.

**St. Giorgio Point**, about  $1\frac{1}{2}$  miles to the NE. of Guardiania light-tower, has a watch-tower on it and is surrounded by rocks and shoal water, the depth at 800 yards E. of the point being five fathoms. Broken rocky ground extends nearly a mile to the southward, and at half this distance from the point the sea breaks on the Kalafati rock, which has only  $2\frac{1}{2}$  fathoms water on it. From a depth of five fathoms, at the extremity of the broken ground, Guardiania light-tower bears SW.  $\frac{1}{4}$  W., distant  $1\frac{2}{3}$  miles. A little N. of this position is a red-topped beacon buoy.

To the westward of this broken ground, and half a mile from the shore, there is a temporary anchorage in fine weather, in  $6\frac{1}{2}$  or seven fathoms, sand, with the light-tower bearing S.  $\frac{1}{4}$  W.

**Lathico Point**, forming with St. Giorgio point on the W the inner points of entrance to port Argostoli, has a face of a quarter of a mile in extent, and is 180 feet high, with a watch-tower on its S. part. From this point to San Theodoro light-house, two miles to the N., the shore forms a slight bay skirted by rocks and shoal water; about midway are patches of  $2\frac{1}{2}$  and three fathoms water, and off the watch-tower under the signal station they extend half a mile from the shore. The shore is backed by a ridge 310 feet high, on which is the signal station, communicating with the town of Argostoli on the E. side of it.

A mill on the spur of a hill about 880 feet high, near the town of Koroklata, kept well open of San Theodoro light-house, and bearing eastward of N.  $\frac{1}{4}$  E., leads westward of the shoal patches.

**San Theodoro Point** is low, rocky, and surrounded from W. to E. by rocks and shoal water. A black buoy is supposed to mark the NW. part of the shoal, with San Theodoro point in range with Lathico point, but in rounding give the point a berth of at least a quarter of a mile, and as shoal water extends off the NE. face of the point and along the shore to Argostoli, vessels should steer well over towards the highland on the eastern shore before hauling in for the anchorage. The monastery on Guardiania island, in range with St. Giorgio point, leads westward of the shoal water around San Theodoro point.

On the NE. part of San Theodoro point is a singular phenomenon; a stream from the sea running into the land between the rocks on the surface, and sufficiently strong to turn two mills. One authority has estimated the quantity of water running in at a million of gallons a day; another 300 cubic feet a minute. Curiosity has led many to endeavor to trace this inflow, large stones have been removed, but after following the windings of the stream between the rocks its descent is lost, leaving to the thoughtful observer a phenomenon not yet sufficiently explained.

**LIGHT.**—The light-house on San Theodoro point is a small structure in the form of a circular white temple with a dome and lantern, from which is shown a *fixed* white light visible five miles.

**LUXURI.**—From St. Giorgio point to Luxuri mole, nearly  $2\frac{1}{4}$  miles to the N., the W. shore is low and bordered by rocks and uneven ground. The E. side of St. Giorgio point should not be approached nearer than 800 yards, and in a vessel of heavy draught a much wider berth should be given to it, by not going into less than 10 fathoms water, nor is there any occasion to stand nearer to the shore N. of the point than this depth.

The town of Luxuri, on the low shore on the W. side of the approach to Argostoli, is the seat of a catholic Bishop, and contains about 5,000 inhabitants; its trade is greater than that of Argostoli, and its position is more healthful. It suffered much from an earthquake in 1867. Near the S. end of the town a mole projects 400 yards from the beach, which covers an anchorage for boats and small trading vessels on the N. Large merchant vessels anchor at about a third of a mile to the NE. of the mole, in seven to 10 fathoms water, mud bottom, or farther out, as convenient.

**LIGHT.**—At 100 yards within the mole head is an obelisk from which is shown, at an elevation of 17 feet above the sea, a small *fixed red* light.

**ARGOSTOLI.**—Facing the town of Luxuri on the E., is the inner entrance to the port and town of Argostoli. Between the shore of San Theodoro point and that of the high land E. of it, the port extends southwards upwards of  $1\frac{1}{2}$  miles, being 1,200 yards wide at the entrance and narrowing within. As the western shore is bordered by shoal water, large vessels should keep midway or nearer the high land on the western shore, where the water is deep. The projecting points of the eastern shore of Livathi bay, in range with Kokinos Vracos, about N. by W.  $\frac{3}{4}$  W., leads up in 12 fathoms water, until the signal station on the hill is in range with the English chapel, a long low building with a clock on the front. Nearly the whole of the inner part of the harbor from abreast the N. end of the town is shoal, and fit only for small vessels. The NE. edge of the shoal water is marked by a buoy.

The town of Argostoli, and capital of Cephalonia, on the western shore at the head of the port, consists of about 2,600 buildings, but none of any importance, the principal being a small theater. The population is about 8,500. A British consul resides here.

There are mills at Argostoli, driven by remarkable streams flowing from the sea into crevices or caverns of the island.

The anchorage is off the Lazaretto in 11 or 12 fathoms, mud, good holding ground; or in a moderate size vessel between the buoy and the eastern shore. With strong winds from the southward, vessels anchor under the lee of San Theodoro point, eastward of the buoy, in 12 or 13



fathoms. There is at times a slight rise and fall of water, and a current sets in and out, but irregular.

The head of the port is separated by a causeway and bridge from the large lake of Kootavos, which gives rise to miasma and causes Argostoli at times to be unhealthful.

**DIRECTIONS.**—Approaching Argostoli from the southward and westward, the Black mountains of Cephalonia, the summit of which, mount Nero, 10 miles eastward of the entrance to the port, will be seen from a great distance. On nearing the port, St. Giorgios castle, on an elevation 1,050 feet above the sea, Thio-nisi with the monastery on its summit, and the white cliffs of the coast, all eastward of the entrance, should be sighted; on the W. is the light-tower of Guardiania island, and the land is lower. In entering the port between St. Nikolo islet on the E. and Guardiania island, with its light-tower, on the W., keep in mid-channel; or if under sail, with a foul wind, avoid the dangers by attending to the clearing marks already given.

From the S. or eastward through the channel by Zante, a vessel should avoid the Kakova shoal, and pass Thio-nisi and the coast westward of it at a prudent distance, and enter in mid-channel as before.

Bound into Argostoli from the northward, after passing the SW. extreme of Cephalonia at a convenient distance, keep the highest part of mount St. Sidaro, which is about half a mile inland, bearing northward of NNW.  $\frac{3}{4}$  W., and well open of the watch-tower on Skisa point, which is low and a little to the SE.; or, as the above mark if not kept well open may lead rather too close to the Akroteri shoals, it will be better to keep cape Gheroghambo bearing northward of NNW.  $\frac{3}{4}$  W.; when Mignia monastery, in the olive grove on the eastern coast, bears E. and in range with a windmill on a ridge at the back, steer for it until Guardiania light-tower bears NNW.  $\frac{3}{4}$  W. distant a long half mile; then steer NE.  $\frac{3}{4}$  N. for Lathico point, and proceed in mid-channel.

**At Night.**—Vessels from the northwestward should not approach the light nearer than three miles; at this distance, and in not less than 13 fathoms water, with the light bearing ENE.  $\frac{3}{4}$  E., steer E. and when the light bears NNW.  $\frac{3}{4}$  W., distant three-quarters of a mile, steer NE.  $\frac{3}{4}$  N. about two miles, and then northward midway between San Theodoro light, on the starboard bow, and the red light on Luxuri mole, on the port bow. When within the entrance, Guardiania light should be kept westward of a SW.  $\frac{1}{4}$  W. bearing, until San Theodoro light bears northward of NNE., to avoid the southern Kalafati five-fathom patches.

From the southwestward, the light may be approached to within

three-quarters of a mile; round it at that distance, and when it bears NNW.  $\frac{3}{4}$  W. steer NE.  $\frac{3}{4}$  N. and proceed as before.

From the southeastward, the light should not be brought to bear westward of NW.  $\frac{3}{4}$  W. until within two miles of it; with this bearing and distance, steer about N.  $\frac{1}{4}$  E. for San Theodoro light, which bring on the starboard bow and proceed as before.

**Cape Gheroghambo.**—From Akroteri point, the low shore trends northward about a mile, when it becomes interspersed with cliff for  $1\frac{1}{2}$  miles farther to cape Gheroghambo; the shore all along is irregular and bordered by rocks and shoal water. On the E. side of the cape is a small rocky bay, and about three-quarters of a mile from it is Skisa point, which is low, with a watch-tower on it which is a mark for avoiding the Akroteri shoals. Cape Gheroghambo is rocky, and a reef projects 200 yards from it to the southward, and other rocks to the NW. lie about the same distance from the shore. Mount St. Sidaro rises 1,200 yards N. of the cape.

**Coast.**—At cape Gheroghambo is the beginning of high land, which trends northward  $5\frac{1}{2}$  miles to cape Ortholithia, when it turns eastward for about a mile, forming the bay of this latter name with a sandy beach at its head, and open to the NW. In this bay there is temporary anchorage for small vessels with off-shore winds. The coast thence continues northward nearly six miles farther to cape Aterra; it is all along composed of bold weather worn cliffs interrupted by small sandy bays, and here and there are scattered rocks near the shore.

Kabbo point,  $1\frac{5}{6}$  miles N. of cape Gheroghambo, is a peculiar tongue of land projecting westward, and over the high cliffs on its northern side is a monastery. At cape Ortholithia, and between it and a short mile S. of it, are several rocks above and below water, but close to the coast. Cape Aterra, the NW. point of Cephalonia, is a bold prominent headland with steep white broken cliffs on its western side, and for  $1\frac{1}{2}$  miles S. of it are several sunken rocks, some of them nearly 400 yards from the shore. The water along this part of the coast is deep at a short distance off.

**Port Attera**, between the cape of this name and cape Kakata, nearly two miles to the eastward, is an inlet  $1\frac{1}{2}$  miles deep, with steep rocky shores on either side, and a small sandy beach at its head. An islet lies in the middle of the port, and small coasting vessels find shelter close in under its lee, but as the water is deep and the inlet open to the N., without village or inhabitants, it is seldom visited.

**Gulf of Myrto.**—At four miles eastward of cape Kakata is the fort of Asso; the coast between forms the gulf of Myrto, which is about three miles deep, between steep and precipitous shores with sandy bays at

intervals. There is no anchorage, and caution should be observed in a vessel under sail so as not to get embayed, as the wind frequently falls to a calm under the high land, and a heavy swell rolls in from the NW.

**Port Asso** is formed by a high double-peaked promontory, crowned by the ruins of an extensive Venetian fortress, and connected to the mainland by a narrow sandy isthmus. The port is open to the N., 400 yards wide, and three deep, and affords accommodation during the summer months to small coasters, that come here for the produce of the well cultivated district; during winter it is seldom visited, being exposed to northerly winds which send in a very heavy sea. Outside the port there are 13 to 17 fathoms water, and sheltered from the SW. by the promontory.

The fortress is in a tolerable state of preservation and of considerable extent, protected on all sides by steep cliffs 440 feet high; it must once have been of great strength; a ditch through the isthmus, now filled in, protected it on the land side.

The village of Asso is on the mainland, with a custom-house and health-office; contains about 1,500 inhabitants, who carry on a considerable trade in currants, raisins, wine, and oil. Small supplies of provisions and water can be obtained.

**The Coast** from port Asso trends northward for  $5\frac{1}{2}$  miles to cape Vlioti, the N. point of Cephalonia; it is formed of red cliffs from 50 to 150 feet high, and has one or two small bays; there are several villages a short distance inland, which are backed by well cultivated ridges. There are two islets and one or two sunken rocks here and there close to the shore; with these exceptions the coast is steep-to.

**ITHACA.**—This island seems to retain its ancient name, and there is, perhaps, no place where the influence of classical associations is so lively or so pure. It is nearly 13 miles in length N. and S., extreme breadth four miles, mountainous, and nearly divided in two by the gulf of Molo, on the E. side; the N. part is 2,066 feet high, and mount Stefano on the S. 2,135 feet high. Currants are grown in large quantities, its wine is excellent, which, with a little oil, are its only exports. The inhabitants amount to 13,000, many of whom lead a seafaring life.

In general the coast is rocky with several indentations, where country boats find excellent shelter. The W. coast runs nearly straight and parallel with the NE. coast of Cephalonia, from which it is separated by Ithaca channel, varying from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  miles in width. The E. coast is irregular, and near the middle the gulf of Molo runs to the SW. about  $3\frac{1}{2}$  miles, nearly separating the island, leaving only an isthmus four-tenths of a mile across.

The shores of the gulf of Molo are steep and rocky, and the water

deep. During gales from SW. to NW. the squalls blow down through the deep gullies of the high land with terrific violence, causing the water to foam. In these gales, vessels unable to enter port Vathi will find anchorage in Ex Aito bay, at the head of the gulf, where the squalls are not so heavy.

**Marmaka Point.**—The N. extreme of Ithaca is a sharp projecting point, clear of dangers and steep-to, and on its E. side is a little bay. The point is six miles from cape Dukato of Santa Maura, and three miles from Arkudi island, the channels between being deep and clear. At  $1\frac{1}{2}$  miles to the SE. of Marmaka point is St. Nikolo point, to the N. of port Frikes; the coast between is high and steep-to.

**Port Frikes.**—At  $1\frac{1}{2}$  miles to the SE. of St. Nikolo point is the termination of a tongue of land projecting to the N.; between the two points is a bay  $1\frac{1}{2}$  miles deep, and at its head is the little port and village of Frikes, with anchorage in three fathoms water. Near the village are remains of ancient ruins, and large niches excavated in the rocks are to be seen surrounded by vegetation.

The shores of the bay are irregular and form two or three anchorages for small coasting vessels. On the S. side of St. Nikolo point is the little port of the same name, circular, and 400 yards in diameter, with a sandy beach; it is fronted by an islet and two sunken rocks, the entrance, which is along by the N. shore, being about 200 yards wide, and within there is anchorage for small vessels, in five fathoms water. The water round the shore of the bay is deep, and a short distance off there are from 30 to 70 fathoms.

**Port Kioni.**—This little port, southward of Frikes bay, is open to the NE., 600 yards wide at the entrance, 1,200 yards deep to the westward, and clear all round; on its N. side is a remarkable round hill, and on its S. point of entrance, are two windmills by which the port may be known. The village is at the head of the port, and the least depth of water, which is from two to four fathoms, is close to it; in the middle of the port there are from 20 to 30 fathoms.

Between the S. point of entrance to port Frikes and the entrance to port Kioni, and about 400 yards from the coast, there is a shoal with five fathoms water, which in a large ship should be avoided.

**GULF of MOLO.**—At a mile to the SE. of port Kioni is cape St. Elias, the N. point of the gulf of Molo. The cape is steep-to, and not much above the sea is a white chapel, and farther in on the high land a windmill; from the cape, the coast trends to the SW. four miles to the head of the gulf. Skino point forms the S. point of entrance and is  $2\frac{1}{2}$  miles from cape St. Elias; the point is the termination of a tongue of land forming a chain of low hills, and at half a mile to the SE. of it

is a large rock or islet close to the shore, with shoal water 100 yards outside it. The island of Atoko, five miles to the NE. of cape St. Elias, serves as a mark for the gulf.

The land on the N. side of the gulf is high, and rises in ridges, with deep ravines, and the coast is straight and everywhere steep-to. On the S. coast of the gulf are three separate anchorages, Skino bay, port Vathi and Ex Aito bay.

**Skino Bay.**—At half a mile to the SW. of Skino point is Nera point, and a quarter of a mile beyond it is Andrea point; between Skino and Nera points is Skino bay, open to the NW., and half a mile deep, with a sandy cove in either corner at the head. In the middle of the bay there are from 32 to 40 fathoms water, and at 200 yards off the beach in either cove there are 20 fathoms. The hill over the bay on the S. is 553 feet high, and rises 900 yards from Andrea point.

**LIGHT.**—Near the extremity of Andrea point is a small white tower, which exhibits a *fixed* white light, visible six miles.

**PORT VATHI**, on the SE. side of the gulf of Molo, is a snug, land-locked little basin. The entrance will be known by the light-tower on Andrea point on the N., and a rocky islet on the S.; the channel in, from the N. end of the islet, is 1,200 yards in length, and narrows to barely 250 yards wide, with from 36 to 21 fathoms water. Within, the port is 1,100 yards deep, and 900 yards wide, but narrows towards the head, the depth of water, except over the inner part, being from 10 to 17 fathoms, mud bottom.

A small, flat, square islet lies on the SW. side of the port, on which is the Lazaretto; the water between it and the shore is shallow. The town, which encircles all the S. and southeastern part of the port, consists of white houses built of stone, all clean and neat, with well-paved streets. The principal part of the town is but little above the level of the water, but on the western side many houses are erected on the ascent of the hill. At the back of the town are large gardens and currant grounds. A wharf on the S. side admits of vessels lying alongside to load and discharge. Several brigs and schooners belong to the port. The population is about 5,500, a large proportion of whom lead a seafaring life. Small quantities of provisions may be obtained, but water is scarce.

Vessels of war usually anchor to the NE. of the Lazaretto (on which is a small *fixed white* light) in 13 to 15 fathoms water. Small vessels lie farther in, in three and four fathoms. At times it blows hard with terrific squalls from the NW., for which vessels should be prepared.

**Ex Aito Bay.**—This is the third anchorage in the gulf of Molo, and is at its SW. extreme, and at the foot of a round hill 400 feet high, which

risers in the middle of the isthmus uniting the two parts of Ithaca; along the head of the bay is an extensive beach, off which, at the distance of 400 or 500 yards, there is anchorage in from 14 to 19 fathoms, sand; farther out the water is deep. On the summit of the hill are the ruins of the castle of Ulysses.

**Coast.**—At  $2\frac{1}{2}$  miles southward of Skino point, on the S. side of entrance to the gulf of Molo, is the projecting point of Sarakaniko, with a large bay on its S. side, having deep water, and open to the SE.; but there is no anchorage. At three miles farther S. is Iganni point, the SE. extreme of Ithaca; between the two points is an islet about 800 yards in length, and 200 yards from the coast, with two fathoms water between, called port Lia, where small coasters anchor. There is nothing remarkable from Skino point southward; the coast is irregular, and the water all along deep.

**Port St. Andrea.**—St. Andrea point, the S. extreme of Ithaca, is two miles westward of Iganni point, and forms the W. point of entrance to the little port of St. Andrea, which is 200 yards wide, and 800 yards deep northward to a sandy beach, where small coasters find anchorage; there are 36 fathoms water at the entrance, which diminishes within to eight and three fathoms, near the head of the port. In the vicinity, on the side of a cliffy hill, is the celebrated fountain of Arethusa.

St. Andrea point, with cape Dekalia of Oephalonia, form the S. entrance of Ithaca channel, which is nearly two miles wide, with bold shores on either side, and deep water.

**Opis Aito** is a small bay with a sandy beach, four miles northward of St. Andrea point, which communicates with port Vathi by a road across the isthmus of Ulysses, to the eastward of mount Aito, the hill on which are the ruins of the castle.

**Port Polis.**—At  $5\frac{1}{2}$  miles northward of Opis Aito is the port of Polis; it is circular, 600 yards in diameter, with its entrance 200 yards wide, open to the southwestward, and directly E. of the islet of Deskalio; there are 17 fathoms water in the middle of the port, but small vessels anchor near the shore. The hill overlooking the port on the N. is 870 feet high. From here the ruins in the vicinity of Frikes are easily visited.

**Oxoi Point**, three miles northward of port Polis, and the E. point of the N. entrance of Ithaca channel, is high and bold, and from a distance westward, is seen before the land of cape Vlioti of Cephalaria, which is much lower. When seen from the westward, it appears as a large round headland with an old tower on its summit. The water in its vicinity is deep, and the current perceptible. The distance from the foot of the high land over port Polis to Phiscardo light-house is about  $1\frac{1}{2}$  miles.

**Aphales Bay.**—At two miles to the NE. of Oxoi point, is the projecting point of Marmaka and the N. extreme of Ithaca. Between the two points is Aphales bay,  $1\frac{1}{2}$  miles deep, open to the NW., with a sandy beach at its head, and beyond it the village of Oxoi; the eastern coast of the bay is steep cliff, which terminates in Marmaka point.

**Directions.**—Coming from the NW. for Ithaca channel, the high land of Santa Maura will be first seen, and then the remarkable white patch of the promontory of Leukate (cape Dukato), the high bold headland of Oxoi point of Ithaca, and finally the N. point of Cephalonia, which is comparatively low. Vessels under sail should not enter Ithaca channel unless with a fair wind, as the water is too deep for anchoring should it fall calm. The currents in the channel are very uncertain, and at times terrific squalls blow down from the high land.

## CHAPTER XV.

THE ISLAND OF ZANTE, GULFS OF PATRAS AND CORINTH, AND  
COAST OF THE MOREA FROM CAPE PAPAS TO CAPE MALEA OR  
ST. ANGELO, WITH THE ADJACENT ISLANDS.

VARIATION IN 1883.

Zante,  $7^{\circ} 52'$  W.

Gulf of Corinth,  $7^{\circ} 07'$  W.

Sapienza island,  $7^{\circ} 32'$  W.

Cape Malea or St. Angelo,  $7^{\circ} 07'$  W.

**ZANTE.**—This island (ancient *Zakynthus*) is separated from Cephalonia by a deep and clear channel eight miles wide. The island is 20 miles in length in a NNW. and SSE. direction, and its extreme breadth nine miles. Its western part is mountainous, the greatest elevation about one-third from the N. end being 2,724 feet above the sea; but the eastern part is mostly an extensive plain, with olive groves and richly cultivated vineyards. Mount Skopo, 1,620 feet high, is a remarkable isolated conical peak, the ridge of which terminates four miles to the SE. in cape Jeraki, the SE. extreme of the island.

Traces of volcanic agency are visible in many parts of the island, which is subject to severe earthquakes; that which occurred in 1840 split part of the high hill at the back of the town, and destroyed and shook many houses. The pitch wells near Kieri bay at the SW. end of the island, mentioned by *Herodotus*, are several circular pits in and near an extensive marsh; the pitch is seen bubbling up through about a foot of clear fresh water, which is not disagreeable to the taste and is drunk by the peasants. These wells were worked for some time, and large quantities of pitch and petroleum obtained, but the work was abandoned.

The chief produce of the island is currants and wine, but olives, oil, and raisins are exported in large quantities. The population is about 45,000.

**Cape Skinari**, the N. extreme of Zante, distant eight miles from the nearest part of Cephalonia, is bold, clifty, about 200 feet high, appears flat on the surface, and has deep water close-to. From the cape, the E. coast of the island trends to the SE. with an inward curve for 12 miles to Krionero point, the N. extreme of Zante bay.

**East Coast of Zante.**—St. Nikolo islet,  $1\frac{1}{2}$  miles southward of cape Skinari, is about 200 yards from the coast, and covers a little bay suit-



able for boats. At nearly two miles farther on is Katastari point, projecting to the N., and forming a bay open in that direction, but suitable only for small coasters. The above coast is rocky with cliffs, and just N. of Katastari point is a large rock, 10 feet high, close to the shore.

Thence follows Alilas bay, having a beach more than two miles in length, with salt pans near the shore at its head, from which the extensive valley or plain extends southeastward throughout the island. With off-shore winds there is good anchorage in Alilas bay, a short mile from the shore, in 13 or 14 fathoms water, good holding ground; small vessels anchor farther in. A range of small hills, and slightly irregular shore, with cliff and beach, bordered by shoal water extending some distance off, and which should be approached with caution, runs SE. to Trenta Nove islet. Trenta Nove is a small, round islet close to the shore, 84 feet high, with a chapel on its summit, and lies  $1\frac{1}{2}$  miles to the NW. of Krionero point, the NW. extreme of Zante bay.

Krionero point is rather low, and surrounded by shoal water at some distance; the land from the point gradually rises to castle hill.

**ZANTE BAY.**—This bay between Krionero and Davia points to the SE., is three miles wide, semicircular, and a mile deep. After passing Krionero point from the N., the town and castle of Zante will be seen having a pleasant aspect. The town extends in a semicircle along the shore of the bay for about  $1\frac{1}{2}$  miles, and is well built, clean, with several churches and fine old Venetian buildings; the pratique-office, custom-house, and post-office near the square at the beginning of the mole, are convenient for shipping. The inhabitants, who are generally gentle with well-cultivated manners, amount to about 22,000. There is a British consular-office here, and regular communication by steam, and electric telegraph. Zante is the only port of exportation in the island, and in September and October, during the currant season, it is particularly animated.

From castle hill, the extensive cultivated plain with the green slopes of mount Skopo forms a splendid panoramic view; at the foot of the mount is Davia point, which is bluff, skirted by rocks, and the termination of the sandy beach which extends along the S. shore of the bay, of which it is the SE. extreme.

**The Mole**, which projects upwards of 400 yards to the SE., affords shelter to small vessels against the strong NE. or gulf winds, which at times send a heavy sea into the bay. The water in the inner part of the mole is becoming shoal, but the mole head is steep-to.

Zante bay is exposed to winds from N. round by E. to SE. The usual anchorage is to the NE. of the mole head, in from seven to nine fathoms water, mud and sand. Small vessels anchor off the mole head, in five or

5½ fathoms, sandy mud. A fair berth for a large ship is, with Krionero point light-house bearing N.  $27^{\circ} 48'$  W., lights on mole head S.  $58^{\circ} 48'$  W., and castle flagstaff W.  $7^{\circ} 48'$  S. in 12 fathoms, mud bottom.

**Supplies.**—Provisions and all kinds of necessities may be obtained; and water from a spring at the watering place, a little within Krionero point, but the supply is limited, or not sufficient for a squadron.

**Dimitri Shoal.**—The southern shore of the bay is bordered by shoal water, and in places it is rocky. At 1,200 yards SE. by E.  $\frac{3}{4}$  E. from the mole head, and 1,000 yards from the shore, is the N. end of a rocky shoal named Dimitri, rather less than 200 yards in extent, with seven feet water on it. The shoal is marked by a ~~red~~<sup>white</sup> buoy, which lies in six fathoms water, 100 yards from its NE. edge. The mole head should be kept westward of a WNW.  $\frac{3}{4}$  W. bearing.

**LIGHTS.**—On cape Krionero is a low yellow building, being 25 feet high, which shows, at an elevation of 93 feet above the level of the sea, a *fixed* white light, visible from a distance of 15 miles.

On the mole head at Zante is an iron column, from which is exhibited ~~two fixed red lights~~, elevated ~~respectively 20 and 30 feet~~ above the level of the sea, and visible about six miles.

**Directions.**—Vessels from the northeastward for Zante bay, should give Krionero point a wide berth, as a rocky shoal extends off some distance. The first hill to the southward of the N. extreme of Zante should be kept well open of Trenta Nove islet, until the S. bastion of Zante castle is open of the E. bastion, and the point should not be rounded in less than 15 fathoms water.

From the southward give Vasiliko point a wide berth, and keep Trenta Nove islet bearing NW.  $\frac{1}{4}$  W. and open of Krionero point; when the mole head bears southward of WNW.  $\frac{3}{4}$  W., and is in line with the S. end of the castle, which will lead well clear of Dimitri shoal, steer into the bay.

**Vasiliko Point**, three miles to the SE. of Davia point, is a low tongue with a sandy beach on either side, and shoal water surrounding it at the distance of a quarter of a mile; between the two points the coast is bordered by a bank, with sunken rocks here and there.

**Cape Ieraki**, the SE. extreme of Zante, and two miles southward of Vasiliko point, is a low cliff, with the ruins of a house on its summit. As this point is low and the termination of mount Skopo, from which it is distant four miles, it is necessary at night, or in foggy weather, to be cautious in rounding it, as from the SW. the mount appears isolated.

**Kieri Bay.**—Between cape Ieraki and cape Marathia, eight miles westward, the coast falls back forming a bay four miles deep, in which are two islets. The land of mount Skopo bounds the E. side of the bay

and that of mount Kieri the western; and its head is a sandy beach, and beyond it the extensive cultivated plain which is spread over the eastern part of the island. On the W. side of cape Ieraki is a small circular cove followed by a cliffy shore as far as the sandy beach, and from the cape the shore is all along bordered by shoal water and scattered, sunken rocks; the water is also shoal all round the beach some distance off. The bay is seldom visited by vessels, as the holding ground is bad, being sand and rock.

The islet of Peluso lies  $1\frac{3}{4}$  miles to the WNW. of cape Ieraki; it is a picturesque islet about 800 yards in length, 282 feet high, and terraced in places with fruit trees and brushwood. On its N. side is a monastery in a small sandy bay, from which well-kept paths lead to the prettiest parts. Within the yard of the monastery is a well of good water. At half a mile to the WNW. of the islet is a shoal with two rocky heads about 200 yards apart; the northern head has six feet water on it, and the southern 13 feet. The shoal is steep-to, and there are five fathoms water between it and the islet.

Marathonisi, in the western part of the bay, is about half a mile in length NW. and SE., 488 feet high, steep, with cultivated terraces and here and there olive trees, and on its summit is an old tower. The islet is connected to the mainland on the NNW. by a reef of large rocks, having from one to three fathoms water over them, and thus forms with the coast on the W., which is distant three-quarters of a mile, the bay of Kieri. In the NW. part of the bay, opposite the pitch wells, is the anchorage of port Kieri, in seven fathoms water, and half a mile from the shingle beach.

The coast from port Kieri trends southeastward for  $1\frac{1}{2}$  miles, and then curves round the foot of mount Kieri, a limestone ridge immediately over it 1,450 feet high, of which cape Marathia is its S. extreme; the coast of the cape is bold, rising in large, steep cliffs, with deep water close-to.

**West Coast of Zante.**—The coast from cape Marathia turns suddenly to the NW. in bold rugged cliffs from 100 to 300 feet high, and continues 14 miles to port Vromi, a small cove about 600 yards deep, with steep cliffs, where fishing boats occasionally anchor. The rocky islet of Aggi Yanni, 110 feet high, lies on the N. side of the entrance to the cove, and is connected by rocks to the coast. At  $4\frac{1}{4}$  miles beyond the islet, and about  $3\frac{1}{2}$  miles from cape Skinari, is a little projection of the coast with the ruins of a church on it; the cliffy coast continues to the cape. The water along the W. coast of Zante is very deep; the line of 100 fathoms curving from a half to a little beyond a mile from the land.

**MONTAGUE ROCKS.**—This dangerous bed of rocks, inside the 10-fathoms curve, extends over a space of 1,300 yards in a N. and S. direction, and consists of four distinct patches, with less than five fathoms water on them. Various reports have been given as to the least water on these rocks; in 1825 and 1828, 15 feet was said to be found on the northern patch, and in 1825 as little as seven feet was stated to be on one of the southern patches, but in the survey of these rocks in 1844 the least depth anywhere found was 17 feet on the northern patch, with the angles between mount Nero of Cephalonia and mount Skopo  $116^{\circ} 17'$ , and between mount Skopo and Kastro Tornese  $94^{\circ} 16'$ . In 1865, a depth of 16 feet was found.

The southern patch, with  $3\frac{1}{2}$  fathoms on it, is 750 yards from the depth of 17 feet on the northern patch. These dangers should have a wide berth, as in the event of light winds or calms a sailing vessel might be affected by the current, which with southerly winds is strong in the vicinity of the rocks. Small country vessels occasionally anchor on the sandy patches. The water on the W. side of the rocks deepens suddenly to 80 and 150 fathoms.

From the least depth on the N. patch cape Skinari bears W.  $\frac{1}{2}$  N. northerly; Kastro Tornese ESE.  $\frac{1}{4}$  E.; and mount Skopo SW.  $\frac{1}{4}$  S. To avoid these rocks at night, Krionero point light bearing SSW.  $\frac{1}{4}$  W. leads well to the westward of them, and SW.  $\frac{1}{4}$  W. to the eastward.

**STROVATHI ISLETS** (ancient *Strophades*) are two rocky islets lying S. by E.  $\frac{1}{2}$  E. 25 miles from mount Kieri, at the S. end of Zante. The larger islet, called Stamphani, is nearly 1,400 yards in length NE. by E.  $\frac{1}{4}$  E. and SW. by W.  $\frac{1}{4}$  W., and on its steep W. end, the highest part and 50 feet above the sea, is a large square light-tower. The coast of the islet is rocky with cliffs; not far from the beach of a small cove, and about 400 yards to the SW. of the NE. extreme, is a fortified monastery of white stone, 88 feet high, with a flagstaff on it. This building is the first object seen from seaward, and in clear weather is visible at a distance of 12 or 13 miles; Stamphani is supplied with water from some remarkable springs.

Harpy, the northern islet, is much smaller and lower than Stamphani, and separated from it by a space of 700 yards; its NW. part terminates in a low sandy tongue. The two islets are connected by shallow ground, and numerous scattered rocks covered and uncovered extend southward from the NW. point of Harpy to a distance of nearly 600 yards westward of its S. end, thence to and around the W. point of Stamphani; these rocks choke the passage between the two islets, except for boats, though a vessel of light draught might thread her way through in fine weather. The route is S. of the Kaleroo rock lying between the

two islets, but it should not be taken without local aid. Around these islets and rocks at a short distance the water is very deep.

There is indifferent anchorage on the E. side, to the N. of the monastery, in from seven to 15 fathoms water, sand and weed. It should be approached with care, as the water is deep, the 50-fathom line of soundings passing about 600 yards from the NE. extreme of Stamphani. The landing place is in the cove near the monastery, where there is a boat slip and pier.

**LIGHT.**—The light-tower, at the W. end of Stamphani islet, exhibits at 127 feet above the sea, a *fixed* white light, visible at a distance of 12 miles.

**The GULF of PATRAS** may be said to commence at Oxia island on the N., and cape Papas on the SE., which are 13 miles apart. The N. coast from Oxia island to the entrance of the gulf of Lepanto is  $31\frac{1}{2}$  miles in extent; and from cape Papas to the entrance of the gulf the distance is 20 miles, the land between falling back forming a bight about  $6\frac{1}{2}$  miles deep. The shores on either side are generally low, backed by high land.

**Scrophia Point**, at the NW. side of entrance to the gulf, and two miles eastward of the S. end of Oxia island, is low and sandy, and within it is an extensive lagoon and fishery. A narrow strip of land projects northward from the point covering port Scrophia, now only suitable for boats, which 50 years ago was sufficiently deep for large brigs; it has been filled in by the alluvium brought down by the heavy rains.

Scrophia point is surrounded by an extensive sandy shoal, with from three to five fathoms water on its edge, which shoals suddenly to  $2\frac{1}{2}$  fathoms, and is somewhat steep-to; the shoal extends a mile southward of the point and along the shore eastward.

Vessels, after rounding Oxia island, should steer for Mavro Vouno, 800 feet high, and three miles S. of cape Papas, and keep mount Stefano, the southern high peak of Ithaca, open southward of Oxia island about WNW.  $\frac{3}{4}$  W. When eastward of the point, which will be known by a bearing of mount Kutzulari, steer for Patras castle.

**Mount Kutzulari**, a sharp, isolated hill, 1,430 feet high, rises  $1\frac{1}{2}$  miles N. of Scrophia point, and, with the N. peak of Oxia island, 1,400 feet above the sea, and two miles to the westward, are remarkable and form excellent marks.

**The Coast** between Scrophia point and Tholie island,  $7\frac{1}{2}$  miles eastward, is very low, with sandy hillocks and covered with brushwood and coarse vegetation, and within it are lagoons and extensive fisheries. The water near the shore is shallow, but it shoals gradually. There is temporary anchorage, in seven to 12 fathoms water, at about  $2\frac{1}{2}$  miles

eastward of Scropha point, and if necessary, anywhere along the shore. At about  $4\frac{1}{2}$  miles eastward of the point, and a mile from the low shore, is a shoal patch, with five fathoms water on it. In approaching any part of the low shore on the N. coast of the gulf, attention should be given to the lead.

**Missolonghi.**—To the eastward of Tholie island are the two sandy islets of Kalamurto and Agio Sosti; on the eastern extreme of the latter, and the W. side of the entrance to Missolonghi lake, is a round, white light-tower, 49 feet high. Coming from the SW., the western slope of mount Zyrghos bearing NNE.  $\frac{3}{4}$  E. leads to the light-tower.

Between Tholie island and Agio Sosti is the usual anchorage, in six or seven fathoms water, sand and mud; inside the five-fathom line it shoals suddenly. Small vessels anchor in five fathoms a short mile eastward of Tholie, somewhat protected by that island and the shoal ground which extends nearly a mile southward of it. There is a boat passage from the light-tower to the town of Missolonghi.

Missolonghi lake is an extensive sheet of water with numerous islets and mud banks; the navigation is intricate and only available for boats. Anatolico lake, N. of Missolonghi lake, is reached by a narrow boat channel through the mud flats  $1\frac{1}{2}$  feet deep; in the middle of the lake is an island, upon which is the town of the same name as the lake, containing 2,500 inhabitants, and connected on either side to the mainland by stone bridges. Fish in large quantities are caught in these lakes, and fever is prevalent in the summer months.

The town of Missolonghi stands on a low swampy, point,  $3\frac{1}{2}$  miles to the NE. of the light-tower, and contains about 6,000 inhabitants; the houses are badly constructed, and the streets are irregular; it is fortified on the land side, and there is but little trade. A British vice-consul resides here. Missolonghi is in communication with other parts of Greece by electric telegraph, and steam vessels call regularly at Agio Sosti.

**LIGHT.**—The light-tower on the W. side of entrance to Missolonghi lake exhibits at 46 feet above the sea a *fixed* white light, said to be visible 10 miles. The light at times is little better than a fishing light.

**Bukari Point.**—The coast eastward of Missolonghi light-tower, is a low sandy shore, with inlets to the lakes and swamps, which are here and there staked with fish weirs. Bukari point, at the W. side of entrance to Phidaris river, and  $6\frac{1}{2}$  miles from the light-tower, is low and shingly, and on the beach about a mile W. of it is a white house. The beach between the point and house is bordered by shoal water, which extends a mile southward, and is steep-to.

To clear Bukari point shoal, vessels should keep Missolonghi light bearing northward of NW. by W.  $\frac{3}{4}$  W., whether bound up or down the gulf. When bound down the gulf, Patras light should be lost sight of on a bearing eastward of E.  $\frac{3}{4}$  S.

**Phidaris River** (ancient *Evenos*) is navigable in boats for  $1\frac{1}{2}$  miles; the water is fresh but muddy. In the vicinity of the coast, the land is low with cultivation and villages here and there; W. of the river for two miles from its mouth it is marshy but wooded inland; eastward of the river it is thickly covered with olive trees and partially cultivated as far as the foot of mount Varasova. The hills to the N. of the low land are covered with pine trees.

**Calydon Bay.**—From the mouth of Phidaris river the low wooded shore trends to ENE. for  $5\frac{1}{2}$  miles to the E. point of Calydon bay; it is all along bordered by shoal water, interspersed with scattered rocks, the depth of five fathoms in places being nearly a mile from the shore. Calydon bay is a bend in the shore under the SW. face of mount Varasova, and affords anchorage for small vessels in the NW. part, off the the mineral spring called Krio-nero. Water may be obtained from numerous springs running into the bay.

**Mounts Varasova and Kakascala.**—The low coast is all along backed by high land, and at nine miles N. of Bukari point mount Zyrgos rises to a height of 3,100 feet; and to the southeastward, rising immediately over the sea, are the conspicuous mountains of Varasova and Kakascala, large masses of rock respectively 3,160 and 3,300 feet high, the latter forming a triangular peak.

**Basiliki Bay** is separated from Calydon bay by the steep, cliffy termination of mount Varasova; on the E. side of the slope of this mountain, near the sea, are the remains of several Hellenic buildings; and in calm weather extensive ruins may be seen under water near the cliffs, probably the ruins of the ancient city of Chalcis. Basiliki bay is formed between the termination of Varasova and the steep coast of mount Kakascala, which rises abruptly from the sea; between the two mountains is a deep valley. The bay affords anchorage for small vessels, except when the wind blows hard from the gulf of Lepanto, which causes a heavy surf. Water may be obtained from a clear stream which turns a mill on the eastern shore of the bay.

**Roumelia Castle.**—From Basiliki bay the coast, for about  $2\frac{1}{2}$  miles, is the base of mount Kakascala, then follows a low, broad, sandy beach for  $3\frac{1}{2}$  miles to Roumelia castle. The shore, at about a mile eastward of Basiliki bay, is bordered by a bank which here extends off about a quarter of a mile, and continues eastward in a wave line to Roumelia castle; but at  $1\frac{1}{2}$  miles westward of the castle the coast bank extends

southward nearly three-quarters of a mile, where the depth is five fathoms.

Roumelia castle (ancient *Anti Rhium*) stands on a low, sandy point, and with the Morea castle on the S. or opposite point, commands the narrows or strait of Lepanto. These castles are  $1\frac{1}{6}$  miles apart, and there are 10 fathoms water close to the projecting points on which they stand.

Torpedoes are frequently placed between Kastro Roumeli and Kastro Morea for experiment and exercise, and to avoid them, vessels passing into the gulf of Corinth must take a pilot at Patras; and passing out, the pilot is left at Patras.

**LIGHT.**—At the S. angle of Roumelia castle, a *fixed* white light is shown at an elevation of 38 feet above the sea, said to be visible six miles.

**Current.**—The current frequently runs through the narrows or strait of Lepanto, at the rate of three miles an hour, changing every six hours in fine weather, but with strong winds the change is irregular.

**Morea Castle** (ancient *Rhium*), on the S. side of entrance to the narrows or strait of Lepanto, is in a fair state of preservation, and is used as a prison. From the castle the low shore trends to the SW. for four miles to the mole of Patras.

**PATRAS** (ancient *Patræ*) is a large and populous town on the coast, at the foot of mount Voidia, which, at about seven miles to the eastward, rises to a height of 6,300 feet. The town, which is considered the best in Greece, is well laid out, the houses being large and usually but one story high, the streets are wide and regular, at right angles to each other, and tolerably clean. On a hill at the back of the town is the castle, probably on the site of the ancient Acropolis, but it is in a dilapidated condition. The town is rapidly increasing in commercial importance, and contains a population of 26,000, and during the currant season another 5,000, principally laborers from Italy and the Ionian islands, arrive here for the time. The roads in the vicinity are either very dusty or muddy.

Large plains extend on either side of the town cultivated with vineyards. Patras formerly suffered from fevers, but since the land has been drained and the extensive marshes brought under cultivation, the health of the town has greatly improved. During the currant season, about 120 English steam vessels arrive here, and take away annually from 60,000 to 70,000 tons of currants. A British consul resides here.

The average height of the barometer during the summer is 30.12 inches; thermometer, maximum 90°, minimum 70°, extreme 100°.

A mole 20 yards in breadth, projects nearly 500 yards at right an-



gles to the beach from the middle of the town, which affords shelter for vessels under 13 feet draught; but during the heavy squalls that prevail from the westward in September and October, the shelter is very indifferent even to vessels to leeward of the mole, whereas it forms a danger to those anchored to windward, as the sea rises suddenly and there is not sufficient time for vessels to be shifted to leeward, and frequently, in consequence of bad ground tackle they become total wrecks.

The harbor of Patras is being enlarged by the construction of a large mole and a large dam. The works are marked by beacons and buoys, and vessels are not allowed to pass through the space included between the line of buoys and beacons.

**Anchorage.**—The anchorage for large vessels is to the N. of the mole, in from eight to 16 fathoms water, bottom mud and sand. With the wind from the eastward, commonly called the gulf wind, neither wind nor sea comes home. During autumn and winter, the anchors should be NE. by E.  $\frac{1}{4}$  E. and SW. by W.  $\frac{1}{4}$  W. of each other, should it be necessary to moor, and if any stay is to be made, the swivel should be put on, as the winds are variable.

**Supplies.**—Water of excellent quality may be obtained at the town with facility, and provisions of all kinds in any quantity. Excellent water may also be obtained from the river Lefka, about  $2\frac{1}{4}$  miles westward of the town, where a boat in moderate weather can lie near enough to the beach to fill with a hose. The best time for watering is in the morning.

**LIGHT.**—On the mole at Patras is a white open structure, which exhibits, at 55 feet above the sea, a *fixed* white light varied by a *flash* every *two minutes*, and said to be visible from a distance of 12 miles.

**Winds.**—The gulf, or NE. winds, blow nine months in the year; it is first observed along the N. shore under mounts Kakascala and Varasova, the summits of which at the same time become capped with clouds. Towards noon the breeze usually reaches the anchorage, and is succeeded by the land wind at sunset. In summer the wind from the NW., or sea-breeze, occasionally blows fresh. The wind from the SE. is hot and scorching, blows strong, and shifts gradually to the SW., when rain, thunder and vivid lightning usually set in for two or three days.

**Cape Papas.**—Between Patras and cape Papas the distance is 17 miles; the coast forms a semi-circular bay, the shores of which are generally low and sandy with gradual soundings all along.

During strong gulf winds, vessels after passing cape Papas, and keeping close in along this shore, carry a strong eddy current to the eastward round the bay towards Patras; the wind also is less strong along this route, and at times a vessel may be almost in a calm with a strong

breeze a mile outside. By standing across the gulf or along by the Missolonghi shore, the full force of the wind will be felt, and a strong westerly current. In case of necessity, there is anchorage all along the southern shore.

Cape Papas, the termination of the ancient *Arazus* promontory, is a low shingle spit, surrounded by a dangerous reef which extends nearly three-quarters of a mile to the westward, and more than half this distance to the northward, the water deepening suddenly.

The W. extreme of the town of Missolonghi in range with the summit of mount Zyrgos, leads westward of the reef; or Missolonghi light-tower in range with the slope on the W. side of mount Zyrgos NNE.  $\frac{3}{4}$  E. This latter is a wide mark, the former is closer but more easily distinguished. East bluff  $4\frac{1}{2}$  miles eastward of cape Papas, bearing SE. by E.  $\frac{3}{4}$  E., and well open of Rocky point, clears the N. extreme of the reef, but Rocky point should have a wide berth.

**LIGHT.**—Near the extremity of the spit at cape Papas is a light-house from which is exhibited, at 30 feet above the sea, a *fixed red* light, visible at a distance of eight miles.

It is intended to establish a *flashing* light on the summit of cape Papas, which will be visible 20 miles. The structure will be of iron.

**Anchorage.**—Karavastasi bay, eastward of Rocky point, affords shelter with westerly and southerly winds, but it cannot be recommended as an anchorage, as the wind frequently and with scarcely any warning shifts suddenly to the NE., and blows furiously with a heavy short sea.

To the southwestward of cape Papas, during strong gulf winds, there is well sheltered anchorage in nine to 12 fathoms, sand.

**Current.**—In the vicinity of cape Papas a strong current is experienced, almost entirely influenced by the wind; it runs more than  $1\frac{1}{2}$  miles to the westward with fresh NE. or gulf winds, and to the eastward with NW. winds. An eddy or counter current sweeps round the bay on the S., towards or from Patras, according to the wind. At Patras, during northeasterly winds, it occasionally runs strong to windward; and at times in moderate weather, the current changes periodically so regular as almost to take of the nature of tides.

**GULF OF CORINTH.**—This gulf runs in about 70 miles to the ESE., and increases its breadth from two to 11 miles, with an irregular coast line which on the N. is indented with deep bays. It is surrounded by high mountainous land reaching 5,000 and 7,800 feet high, and the beauty of its scenery surpasses even the lakes of Switzerland and northern Italy.

The predominant winds in the winter are from the ESE., and in the summer from the WNW.

On the island of Trazoni, is the quarantine establishment for the whole of the gulf, including Patras.

**Lepanto.**—From Roumelia castle, on the N. side of entrance to the gulf, the low, sandy shore, which is bordered by a shallow bank at the distance of a third of a mile, trends to the NE. for  $4\frac{1}{2}$  miles to the citadel Lepanto (ancient *Naupactus*). This citadel stands on a hill about 480 feet above the sea, the termination of a spur of mount Rigani or Rigano. Viewed from seaward, Lepanto presents the form of a triangle, with the citadel on the summit, while the walls diverging downwards, and then skirting the shore, forms the three sides. The town occupies the lowest part, and is in a dilapidated condition. Population about 2,000. Steamers call here.

Vessels usually anchor off the town, in from seven to 13 fathoms water, but it is not safe to remain here in bad weather. There is a small boat harbor here, but it is choked up, and there is but little or no trade. Mount Rigani, at  $4\frac{1}{2}$  miles northward of Lepanto, rises in two summits 3,967 and 4,672 feet high, the latter being to the westward.

**Morno Point.**—At  $2\frac{1}{2}$  miles to the SE. of Lepanto is Morno point, projecting to the southward; the shore between is low, the first part being the delta of the river Morno (ancient *Hylætus*), and the land within forming the plain of Pilala. The point should not be approached too near, nor the low shore which trends from it to the NE. for  $3\frac{1}{4}$  miles, and which is all along bordered by shoal water, at the distance of more than a third of a mile.

**LIGHT.**—On Morno point is a basement of white masonry, with an iron column from which, at 46 feet above the sea, is shown a *fixed red* light, visible at a distance of seven miles.

**Drepano Point** is  $3\frac{1}{2}$  miles to the NE. of Morea castle, on the S. side of entrance to the gulf; the shore between is a low sandy beach, and forms two bays. Drepano point projects northward towards Morno point on the opposite side of the gulf, and is low, alluvial land, with a tongue of shoal ground extending 800 yards to the NW., terminating in a rock, awash, with deep water close-to. At about  $1\frac{3}{4}$  miles eastward of Drepano point the low shore ceases, and high land continues all the way to the gulf of Corinth. A long white watercourse, running from near the summit of a mountain to the sea SW. of the point, is conspicuous.

**LIGHT.**—At 400 yards SE. by E.  $\frac{3}{4}$  E. from the extremity of Drepano point, is a wooden structure which exhibits at 28 feet above the sea a *fixed white* light, visible seven miles.

**Directions.**—The castles of Roumelia and Morea, at the entrance of the gulf of Corinth, are easily recognized; vessels entering with a fair

wind should keep midway between the two, and then steer about NE.  $\frac{1}{4}$  E., until on a line between Roumelia castle and Morno point; then steer for the point on the above line (at night the white light of the castle should be astern, and the red light on Morno point ahead) until within  $1\frac{1}{2}$  miles of the latter, or Drepano point light bears S. by E.  $\frac{1}{4}$  E., when steer about E.  $\frac{1}{4}$  S. nearly mid-channel, altering course as convenient.

In fine weather with a foul wind, a sailing vessel should keep along by the Patras shore and the Morea castle, until convenient to stand northward towards Lepanto, which will depend on the direction of the wind and the strength of the current; the shore on either side should be approached with prudence, being bordered by narrow banks, and the rock awash off Drepano point should be avoided. During fresh northeasterly winds, when a strong current may be expected to set out of the gulf, anchorage will be found in Patras roads.

**Port Trazoni.**—At eight miles eastward of Morno point is the island of Trazoni with two islets to the E. of it; the three collectively are known as the Trisonia islets. On the E. side of Trazoni, is a secure little port of the same name open to the eastward. Here is located the lazaretto and quarantine establishment for the whole gulf. The island is nearly two miles in length, hilly and parallel to the coast, from which it is distant 400 yards; although about 115 feet high, it appears low, being under the high land of mount Trikorfou, which is 4,248 feet above the sea.

Drimna islet lies 800 yards to the E. of Trazoni, with deep water between; the islet is triangular in shape, more than 600 yards in extent, high and steep to the SW. A rocky shoal lies off its NE. face at the distance of 300 yards.

Ekisto islet is smaller, a mile eastward of Drimna, and 800 yards from the nearest part of the coast. At 600 yards westward of its N. end is another rocky shoal. Therefore the passage between the two islets should not be used.

**Directions.**—Coming from the westward for port Trazoni, mount Trikorfou, the summit of which is  $3\frac{1}{2}$  miles to the NE. of the island, will indicate its position, and on a near approach, the island and passage separating it from the coast will be seen. In entering the passage, keep in mid-channel, but on approaching the eastern part, borrow on the coast, so as to avoid the shoal surrounding the NE. part of the island at the distance of 200 yards; when the SE. point of the island bears S. by E.  $\frac{1}{4}$  E. and is well open of the point N. of it, steer southward and enter port Trazoni, where there is anchorage in 13 fathoms water, mud

bottom; or farther out if necessary. Small coasters anchor farther in, in five fathoms.

In entering the port, S. of Trazoni, the island may be coasted along at a prudent distance, and the passage taken between it and Drimna islet, which is deep and clear.

From the SE., having passed cape Psaromyta, steer direct for Trazoni, and when in the vicinity of Drimna islet leave it on the right, and enter the passage between it and Trazoni as before.

This is a very unpleasant place to perform quarantine, as there are but few supplies. Good water may be obtained from a small stream, two miles to the NW. of the anchorage; a large boat can go alongside an old pier, close to the stream, and pump the water in.

**Cape Psaromyta**, at nearly five miles to the SE. of Trazoni island, is the termination of the mountainous ridge extending from mount Trikorfon and which declines in three gradual slopes towards the sea; the land at about two miles from its extremity is 1,750 feet high. The cape is clear of danger and may be approached at discretion.

**Petrinitza Bay**.—Between cape Psaromyta and cape Andromache nine miles to the eastward, the coast forms two or three bays, with some sandy beaches; in the first of these,  $2\frac{1}{2}$  miles from cape Psaromyta, is the beach and scala of Petrinitza, with a fertile valley between the mountains to the NW. The beach is steep, and exposed to winds from the SE., but in fine weather small coasters anchor in 10 fathoms, 200 yards from the shore. It is in communication with other places in the gulf of Corinth. A large rock or islet lies close to the coast about a mile SE. of Kiseli bay next E. of Petrinitza, and another but smaller rock near cape Didavra; with these exceptions, the coast is clear with deep water all along to cape Andromache.

**Salona Bay** (the ancient gulf of *Crissa*) is formed between cape Andromache on the W. and cape Nikolo; from cape to cape the distance is nine miles, and from this line the bay to the head of port Salona is nine miles deep. The E. coast of the bay, with the exception of port Karindria, an inlet open to the NW., is without a break, and clear of danger; the western coast is irregular, with several islets and dangers. The bay is surrounded by high mountains, culminating to the NE. in the celebrated mountain of Parnassus which rises 8,068 feet above the sea. Parnassus was in classic times the fabled haunt of the muses, and possesses, among other noted spots, the Castalian spring, and the ruins of the temple of Delphi; on or near the site of which is now the town of Kastri. The severe earthquake, which took place in August, 1870, caused much distress along the coast in the vicinity of this bay.

**Port and Andromache Shoal.**—Cape Andromache is high and bold, but in a vessel of heavy draught, it should not be approached too close. At two miles to the NE. of the cape is the port of the same name, nearly 1,200 yards square, with inlets in the inner corners fit for small craft, and in the middle of the port 26 fathoms water.

Andromache shoal lies 700 yards E. of the S. point of the bay, with two fathoms water on it, five and six fathoms around it, and deep water outside the six-fathom curve. Small vessels pass between it and the land, but large vessels should go outside it.

Demetri islet, bearing N. and in range with the center of the town of Itiar, will lead to the eastward and well clear of Andromache shoal, the red islet being easily seen; or a nearer but wider mark is the W. end of San Giorgio islet just open of the E. end of Ipsolitha, the southernmost islet, and which has a small white house on it.

**PORT GALAXIDI** is to the N. of port Andromache, and separated from it by a promontory projecting eastward. The port is a large bay, being a mile in diameter, and has 15 to 18 fathoms water in the center. It is protected by a chain of islets and shoals extending to the NE. from the S. point. In the S. part of the bay are two creeks, one on either side of the town, the larger being to the SE., which is generally filled by coasting vessels.

The town of Galaxidi, standing partly on a projection between the two creeks, contains about 4,500 inhabitants, who mostly lead a seafaring life, and are employed in the construction of vessels for which the town is famed. In 1821 the Turks took from this port several millions of francs worth of shipping. The building of vessels is still carried on to a large extent, as in 1875, at this town and in the neighborhood, no less than 17 vessels were built, amounting to 3,793 tons; the largest vessel was 600 tons, and the average 223 tons. There is regular steam communication with other ports in the gulf.

**Islets and Channels.**—Of the islets and shoals protecting port Galaxidi on the E., there are four of the former, with passages between them into the port. Ipsolitha, the first and southern islet, is 200 yards in length, with a small white house on it; it lies 300 yards from the shore of the S. point of the port. San Giorgio, the second islet, is larger and higher than the others, 400 yards in diameter, and lies 400 yards N. of Ipsolitha. The channel between these two islets is the usual passage into the port, and carries six fathoms water. The third islet is 650 yards N. of San Giorgio, and midway between the two is a shoal with eight feet water on it. Demetri, the fourth islet, is about 200 yards in diameter, and 1,400 yards eastward of the third islet, with shoal patches between, having from six to nine feet water on them.

**Directions.**—After passing cape Andromache, which should have a fair berth and not brought to bear southward of WSW.  $\frac{1}{4}$  W., steer NE. by E.  $\frac{1}{4}$  E. until Demetri islet bears northward of N. by E.  $\frac{1}{4}$  E. or the W. extreme of San Giorgio islet is just open of the E. end of Ipsolitha islet; with either of these marks proceed to the northward, and when abreast of Kavos point, the N. extreme of port Andromache, steer as convenient for San Giorgio islet and pass midway between it and Ipsolitha, leaving on the left, at the distance of 200 yards, a small islet which lies NW. of Ipsolitha. Anchor off the town where convenient, in eight to 10 fathoms water, mud bottom.

The entrance N. of the islets is wide, but as the water shoals to the northward of them, a vessel should round Demetri islet from the eastward, at the distance of a half a mile, and steer westward midway between it and the N. shore of the port until within the islets, and then steer for the anchorage.

**Port Salona**, in the N. angle of the great bay of the same name, is circular, about 1,600 yards in diameter, and 800 yards wide at the entrance, which is between Marathia point on the E., and the shore on the W. Shoal water extends 400 yards southward of Marathia point and along the shore of Barthos bay. The three islets, lying eastward of the bluff point of Tripa, have shoal rocky ground between and around them; there is a passage for coasters between these islets and the bluff point.

In proceeding for port Salona, steer to the northward, and pass half a mile eastward of Demetri islet; when the islet bears S. by W.  $\frac{1}{4}$  W., do not bring it southward of that bearing, steer N. by E.  $\frac{1}{4}$  E. until Ruin islet, the northern of three off Tripa point, bears W.  $\frac{1}{4}$  N.; then steer towards Marathia point, and anchor N. of the latter islet nearly midway between it and the village of Itiar, in eight to 10 fathoms water, sand and mud bottom, with the centre of the village about N.  $\frac{1}{4}$  E. The bank off the village is 400 yards from the shore and steep-to.

If it is intended to enter port Salona, round the low sandy point of Marathia, avoiding the elbow of the shoal on its S. side, and anchor about a quarter of a mile N. of the point, in seven to nine fathoms, where a vessel will be sheltered from all winds. It is excessively hot and sultry here in the summer. There is a rise of tide at springs, of about two feet. The scala is in steam communication with other ports.

The town of Salona (ancient *Amphissa*), about six miles N. of the scala, and at the foot of mount Parnassus, is defended by a castle, and has several well built churches and manufactories; between it and the scala is a fertile plain covered with olive trees, and bounded by high mountains.

**Aspra Spitia Bay.**—Passing cape Nikolo, the E. point of Salona bay, and the termination of the high mountain of separation, we come to Aspra Spitia bay, which falls back to the N. about  $6\frac{1}{2}$  miles, and at the entrance is four miles wide. The western coast of the bay is high and irregular, with several projecting points, and at  $2\frac{1}{2}$  miles in, and half a mile from the shore is the islet of Daroko, about half a mile in length. The port of Aspra Spitia or Anticyra is in the NW. corner of the bay, sheltered by the promontory of mount Kephali, and is the scala of the town of Livadia in the interior; it carries on a considerable trade.

Near the E. point of entrance to the bay, at the foot of the shoulder of mount Helicon 2,330 foot high, are three islets, with ruins on the westernmost. There are no hidden dangers in the bay, the water is deep, and the shore may be approached to within a prudent distance. The anchorage at port Aspra Spitia is in about 15 fathoms, and considered safe. Mount Parnassus rises N. of the bay.

**Zalitza Bay.**—From the E. point of entrance to Aspra Spitia bay, the high coast trends eastward five miles to the low straight shore at the head of Zalitza bay; at the S. end of this low shore, the coast becomes high and turns westward to cape Velanidia, which is nine miles from cape Nikolo. Zalitza bay thus formed, is  $2\frac{1}{2}$  miles deep to the E., and nearly the same distance across at the entrance; at about half a mile from the shore at the N. side of entrance is a rocky shoal, but elsewhere there are no dangers.

**Port Sarandi.**—Tambourla point is  $7\frac{1}{2}$  miles to the southeastward of cape Velanidia; the coast on the W. side of the point runs straight to the N., and forms between it and the cape a bight, at the head of which is port Sarandi, open to the S., more than a mile deep, with a sandy beach at its head, and about 1,200 yards wide. The water in the middle of the port is deep, and a quarter of a mile from the head, there are from 17 to 20 fathoms. Tambourla point projects to the southward, and off it are two islets; the smaller about 400 yards S. of the point, and the larger called Vromo three-quarters of a mile W. of the former.

**Mount Helicon.**—This celebrated mountain extends E. and W. along this part of the coast from the entrance to Aspra Spitia bay, where mount Verseniko, its western shoulder, rises from the sea to a height of 2,330 feet; at  $4\frac{1}{2}$  miles eastward, Kiveri peak, which is 5,130 feet high, rises inland at the head of Zalitza bay; and three miles farther eastward is Paleovouna, the highest peak in the range, which reaches an elevation of 5,740 feet.

**Dobrena Bay.**—This magnificent bay is nearly five miles in length, E. and W., and from one to  $1\frac{1}{2}$  miles in breadth. In the middle is an islet about a third of a mile in length N. and S. The shores of the bay



are rocky and irregular, the water is generally deep, and there are no hidden dangers. The entrance is to the S., and fronted by three islands which makes a basin of the interior; the largest island is to the eastward. The best passage into the bay is the western, about two miles from Tambourlo point, leaving all the islands to the right.

Mount Korombili, which is conical and 2,670 feet high, rises over the eastern part of the bay, and serves as a good guide.

**Livadostro Bay.**—This bay at the E. end of the gulf of Corinth, is about six miles wide at the entrance, which is between Tambourlo point on the N., and cape Olmiæ on the S., thence it extends eastward 13 miles. The Kala islets, lie three miles southward of the entrance to Dobrena bay, but they are of little importance. To the eastward of Dobrena bay, is an inlet, two miles wide at the entrance, called port Livadostro; on the W. side of this inlet, the coast rises perpendicularly from the sea to the high land of mount Korombili. Mount Elatia (ancient *Cithæron*) is 3,680 feet high, and rises to the NE. of the port of Ghermanó (ancient *Ægosthena*) which is open to the W.; the low shore at its head is the E. extreme of the gulf.

The southern coast of Livadostro bay, is the base of a chain of mountains of which the greatest elevation is mount Geraneia 4,494 feet high. The peak of Melangavi or Melangava about six miles westward of mount Geraneia, is remarkable, rising 3,468 feet above the sea from the low land forming the isthmus of Corinth, and is a good guide for the bay of Corinth or Korintho.

**Kalanisia or Kala Islands,** are four islets lying nearly in the middle of the entrance of Livadostro bay, occupying a space of  $1\frac{1}{2}$  miles in extent NW. and SE.; Kala the largest and eastern islet rises in two hills, and is connected to the NW. islet, which has one hill, by a shallow sandy neck. The other two islets are lower and smaller, also connected by shoal water, and lie 400 yards to the SW., nearly parallel to the two larger islets. A shoal extending 400 yards to the SE. from the larger of the two SW. islets, leaves between it and the coast bank of Kala, a deep passage about 200 yards wide where there is anchorage, in 18 fathoms; the entrance on the NW. is wider. The ruins of a church lie on the W. side of Kala. These islets being surrounded by the high land of the gulf appear lower than they really are.

**Corinth or Korintho Bay** is formed by the promontory of Melangavi which terminates in the cape of the same name, and which separates the bay from that of Livadostro on the NE. The bay of Corinth is four miles wide between cape Melangavi and the shore to the SW. and extends in seven miles southeastward, to the isthmus of Corinth at its head. The S. shore is low, partly cultivated, and at a short distance in rises to

the high land. There are no dangers and the water is everywhere deep to within a prudent distance from the shore.

The isthmus of Corinth is 184 feet above the sea, and the distance across to port Kalamaki about  $2\frac{3}{4}$  miles; on the NE. side is the high land of mount Geraneia, and to the right the various elevated mountains of the Morea. At  $1\frac{1}{2}$  miles from the shore on the S. are the ruins of the celebrated city of Corinth; traces of the ancient walls are still to be seen, and a few Doric columns, the relics of a temple, are the principal and most interesting monuments now remaining. The present town has assumed a neat and orderly appearance, and is still progressing. There is an electric telegraph station here. Near it is the Acro-Corinthus or Acropolis, on a steep elevation 1,830 feet above the sea; within its walls are no remains of antiquity or anything of interest to be seen, but the eye is gratified with an extensive and magnificent view.

At New Corinth, on the SE. shore of the bay, is a mole, and at half a mile off it there is a fine weather anchorage in 12 to 15 fathoms water; but large vessels should anchor farther off. New Corinth has regular steam communication with the Adriatic and Ionian islands, and *via* a good road across the isthmus to Kalamaki, and thence by steam with Athens and Constantinople.

A fair anchorage with NW. winds, is at Loutraki in the NE. part of the bay, at the foot of the peak of Melangavi, but a vessel anchoring here will be rather close to the shore, and the water is deep.

**SOUTH COAST.**—From the head of the bay of Corinth, the coast of the Morea westward as far as Vostitza, a distance of nearly 45 miles, has no port but only open roadsteads, where coasting vessels during fine weather, collect the produce of the country at the different scalas or landing places. The coast is all along clear of danger and may be approached at discretion. Among the different grand and arid mountains of the Morea, mount Zyria (ancient *Cyllene*), rises 7,800 feet above the sea. Several mountain torrents discharge into the gulf, but do not merit any particular mention.

**Avgo Peak.**—A special object of recognition on this coast, is the white conical peak of Avgo, which rises close to the shore about 24 miles from the mole at Corinth, and nine miles S. by W.  $\frac{3}{4}$  W. from cape Nikolo; it is seen from all parts of the gulf and is an excellent mark.

**Akrata Point**, at about  $7\frac{1}{2}$  miles to the NW. of Avgo peak, is low, and formed of the alluvium from the river of the same name; the point projects to the N. and should have a wide berth.

**Vostitza** (ancient *Ægium*).—The bay of this name, about 17 miles from the entrance of the gulf of Corinth, is semi-circular, open to the N.  $1\frac{1}{2}$  miles wide between the points of entrance, and nearly a mile deep.

The water, to within half a mile of the head of the bay, is deep, when it shoals from 25 to 10 fathoms.

The town of Vostitza stands on a steep flat hill about 50 feet above the sea, in the S. part of the bay, and contains 4,000 inhabitants. It has regular communication by steam and electric telegraph with other ports; currants are shipped here during the season; good water in great abundance is easily obtained, except when a sea sets into the bay, and also small supplies. There is a rare plane tree here about 45 feet in girth.

Vessels from the westward should keep in the middle of the gulf until near Trazoni island, and then steer to the southeastward for the town, which when first seen appears in two parts, the lower part being separated by the brow of the hill from the higher. Merchant vessels anchor off the W. angle of the town, 400 yards from the shore, in about 15 fathoms water, mud and good holding ground; vessels of war a little farther out. The points of entrance should not be rounded too near, as the shore all round is flat, low and sandy. The anchorage is sheltered from the prevailing winds, which blow strong up or down the gulf, especially those from the eastward during the winter months. From the eastward, cape Psaromyta  $4\frac{1}{2}$  miles NE.  $\frac{1}{2}$  E. of the E. point of Vostitza bay, will indicate its position.

**Coast.**—At nearly four miles westward of Vostitza bay, is Salmeniko point, which is low and projecting, with the rivulet of the same name running into the sea on its W. side; beyond the point is cape Lambiri, at the foot of mount Lubista, 2,230 feet high, immediately within it; then follows, at  $5\frac{1}{2}$  miles farther on, Drepano point. The coast all along offers nothing remarkable. In case of necessity, temporary anchorage will be found on the S., in a little bay eastward of Morea castle. The bay will be easily known by the long white watercourse running from near the summit of the mountain to the head of the bay, and the anchorage will be in 15 to 18 fathoms, mud bottom, about 300 yards from the shore.

**MAVRO VOUNO.**—In continuation of the coast from cape Papas, the land immediately to the southward rises in rounded dark hills. Mavro Vouno the highest, 800 feet above the sea, and nearly three miles from the cape, falls suddenly to the plain on the S., whence a low, sandy beach, fronting the densely wooded low land, extends southward  $3\frac{1}{2}$  miles to Kounupelli point, which is a rocky, isolated elevation about half a mile in extent, 200 feet high, and has the ruins of a tower on its NE. part.

**Cape and Village of Glarenza.**—From Kounupelli point, the low sandy shore, wooded and cultivated within, continues south-westward to cape Glarenza, a distance of nearly 15 miles.

Kotiki lake, close to the sea, and nearly midway between the point and cape, is about  $2\frac{1}{4}$  miles in length, with brackish water, and contains an abundance of fish; it communicates with the sea by a narrow outlet. At two miles to the SW. of Kotiki lake, is a smaller one named Aliki, and beyond the latter to the SE., is the populous village of Lekhena, containing upwards of 600 houses. To the NW. of Kotiki lake, and nearly two miles from the shore, there is a seven-fathom rocky patch; and off the S. end of the lake, and  $1\frac{1}{4}$  miles from the shore, is a five-fathom patch.

Cape Glarenza is a rocky projection, a large rock above water lies off its N. extreme, and rocky shoal ground extends more than 300 yards outside this rock, and along the NW. face of the cape, also around Kaufkalida islet. In rounding the cape for the anchorage off the village of Glarenza, a wide berth should be given to it; discolored water will probably be seen.

On the E. side of cape Glarenza the shore forms a bay three-quarters of a mile deep, open to the N., and at the western part of it, is the little village of Glarenza, with a custom-house and a small mole projecting about 200 yards to the NE. The produce of the richly-cultivated land in the neighborhood is principally shipped to Zante. At about half a mile off the village, is an excellent summer anchorage, in five and six fathoms, sand and mud; coasters anchor farther in. The Greek steamers call here regularly.

To the NW. of the village, near the extremity of cape Glarenza, are the ruins of ancient *Cyllene* consisting of a tower, tombs and fragments of walls, and the remains of an ancient mole and port.

**LIGHT.**—On the mole head at Glarenza is a stone column from which is exhibited, at 39 feet above the sea, a *fixed* white light, visible eight miles.

**Kastro Tornese.**—The islet of Kaufkalida, 18 feet high, rather more than 200 yards in diameter, lies about a third of a mile off the W. extreme of cape Glarenza, and is nearly connected to it by a reef of rocks awash; a little eastward of the islet is a large rock above water. There are some Hellenic remains on the islet, and pasturage for a few goats. The edge of the coast bank, in five fathoms, is about a quarter of a mile outside the islet.

From cape Glarenza the coast trends southward  $6\frac{1}{4}$  miles to capé Trepito; it is clifty, with a sandy beach, and bordered by a bank which extends off nearly half a mile. The coast is backed by high land, and about midway is a remarkable hill on which is the castle of Tornese, ancient *Chalonites*, 857 feet above the sea, forming a conspicuous object. At the foot of the castle is the little village of Klemotuzi, and inland are the cultivated and wooded plains of Elis.

The Montagne rocks lie W. by S., distant six miles from Kaufkalida islet. Vessels bound to Patras from Zante usually stand across towards Tornese castle, until within three miles of the coast, and then steer to the northward. With southerly winds the current is strong in the vicinity of the rocks, and between them and the shore of Tornese.

**Cape Trepito** is cliffy on its W. side, but on the S., between it and Glossa point, it is sandy. At  $1\frac{1}{2}$  miles N. of the cape a small stream runs into the sea, near which are petroleum springs, which have been worked with success.

**COAST.**—At  $15\frac{1}{2}$  miles to the SSE.  $\frac{3}{4}$  E. of cape Trepito is cape Katakolo, the intermediate coast forming a curve four miles deep with a low sandy shore, the interior being cultivated and the continuation of the plains of Elis. During fine weather in summer, vessels may anchor anywhere in from nine to 12 fathoms, sand. The river Gastouni, ancient *Peneus*, runs into the sea about six miles from cape Trepito, and is sufficiently deep to allow large boats to ascend several miles. At Palouki point, four miles to the SE. of the mouth of the Gastouni, rocks extend off half a mile, and here and there are scattered along the coast to the southward, until within a mile of cape Katakolo; this part of the shore should not therefore be approached nearer than a mile.

The monastery of Skaphidia, standing on the foundation of an ancient Venetian fortress at an elevation of 370 feet above the sea, and four miles northward of cape Katakolo, is inhabited by about 50 monks, and is a conspicuous object. Pondiko Kastro, the ruins of an ancient fortress 284 feet high, and two miles northward of cape Katakolo, is also remarkable and a guide to Katakolo bay. A few miles inland are mounts Mouria and Kremasti, 931 and 1,165 feet high respectively.

**Cape Katakolo** is low and the extremity of a tongue of land projecting to the southward; the coast on the W. and N. of the cape is irregular, and bordered by rocky shoals and the two islets of Koraki and Tigani; the E. or in-shore side of the cape is also bordered by rocky shoals and a sandy spit terminates to the ESE.  $\frac{3}{4}$  E. of the cape, at nearly a third of a mile from it. In rounding the cape, give it a berth of half a mile.

**LIGHT.**—On the slope of the ridge, about 800 yards N. of cape Katakolo, is an octagonal light-house of gray stone, which exhibits at 150 feet above the sea a *revolving* white light attaining its greatest brilliancy every *two minutes*, and visible from a distance of 17 miles.

**Katakolo Bay.**—The tongue of land which terminates in cape Katakolo, forms with the E. coast a semi-circular bay with a sandy beach at its head. The bay is two miles deep, but exposed to southerly winds which send in a heavy sea. At a short mile from the cape, a mole pro-

jects about 300 yards to the eastward, and to the N. of it, in a small bend in the shore, is the village and custom-house. The mole affords excellent shelter for coasting vessels from southerly winds; the bottom, from the inner part of it to the custom-house, is rocky and the water shoal. There is anchorage all over the bay, and the water shoals gradually towards the beach at its head, but rather suddenly towards the village. The usual anchorage is about 600 yards NE. by E.  $\frac{1}{2}$  E. of the mole head.

Katakolo is in steam communication with other ports, and during the fruit season several large steamers load with currants, raisins, and wine, the produce of the plains of Pyrgos. Water is scarce, there being but one well at the head of the bay near the commencement of the long, sandy beach. The town of Pyrgos stands on a hill  $7\frac{1}{2}$  miles from Katakolo, with which it is connected by telegraph. It has a population of 5,000. The surrounding plains are richly cultivated, but near the sea the malaria arising from the lakes causes the air to be unwholesome.

**GULF OF ARCADIA.**—This gulf or bay (the ancient *Cyparissius Sinus*) is formed between cape Katakolo and cape Kunello 31 miles to the southward, and from a line between the two capes the gulf is 10 miles deep. The shore nearly the whole length of the gulf is low and sandy, backed by high mountainous land. A little inside the beach at the NE. part of Katakolo bay is lake Mouria,  $2\frac{1}{2}$  miles in length. To the SE. of lake Mouria, and nearly seven miles to the ESE.  $\frac{3}{4}$  E. of cape Katakolo, is the mouth of the river Rouphea, ancient *Alpheus*, one of the largest streams in the Morea, and which boats ascend between three and four miles, carrying from two to four feet of water. Vessels anchor off the river in the summer months and load with timber for shipbuilding, which is floated down the stream.

The coast from the mouth of the Rouphea, until within  $3\frac{1}{2}$  miles of the town of Kyparissia, is a clean, sandy beach, with several streams running into the sea. At  $1\frac{1}{2}$  miles from the Rouphea is the continuation of the chain of lakes extending along the coast and which here is named Agoulinitza or Rouphea, and Kaiffa; the former is seven miles in length, and the latter  $2\frac{1}{4}$  miles, and the whole extent of the lakes is nearly 16 miles. These lakes abound in fish, and are separated from the sea by a narrow strip of sand covered with trees, which are principally pine. A mile within lake Kaiffa is the mountain of the same name, 2,445 feet high, and easily distinguished.

**Water.**—During fine weather in summer, vessels may anchor off the mouth of the Rouphea, about  $1\frac{1}{2}$  miles from the shore, and water may be obtained by leading a long hose into the boats. With the wind off

the land is the best time for watering, as with sea winds a swell sets in. The S. side of entrance to the river is the best for watering, as the beach is steep and the boats get nearer to it.

**Kyparissia.**—The town of Kyparissia, commonly called Arcadia, is built on the site of the ancient city, about half a mile from the beach, on an elevated spur of mount Psykro, which, at about three miles inland, rises 4,156 feet above the sea. The town is at the foot of the ancient Acropolis, contains about 5,000 inhabitants, and is conspicuous from seaward.

Coasting vessels anchor off the town in about 15 fathoms water during the summer months, and load with grain; but the roadstead is exposed to the prevailing winds from the NW., which send in a heavy sea. A small inlet, open to the N., with a mole projecting from its western point, affords shelter for smaller craft.

The coast from  $3\frac{1}{2}$  miles northward of Kyparissia becomes rocky, with a few sandy bays at the outlets of mountain streams, and curves round to the SW. for a distance of about 11 miles to cape Kunello, the southern limit of the gulf of Arcadia; from the southward the land appears to slope gradually to a low point.

Mount Morena, a little southward and  $2\frac{1}{2}$  miles within the cape, is an isolated conical hill, 1,250 feet high, and easily recognized.

**Proti Island** (ancient *Prote*).—Between cape Kunello and Marathon point, about  $6\frac{1}{2}$  miles to the southward, the coast is rocky but clear of danger, with two or three streams running into the sea. A well-cultivated plain, with extensive olive plantations and several villages, extends inland to the foot of the high, rugged mountain range of mount Agia, which rises 3,957 feet above the sea, and runs parallel to the coast.

During summer, small country vessels anchor off the little bights in the coast to collect the produce.

Proti island is in shape like a mushroom, with its stem to the S.; it is two miles in length N. and S., and the part representing the head of a mushroom is one mile in breadth, and 605 feet high, with a cliffy ridge around its upper part, except on the NW. side.

From the southward it appears round, but from the westward the N. end is high and round, and the S. end low. The island is wooded, covered with brushwood, rocky, steep-to, and separated from Marathon point by a channel 1,200 yards wide.

The village of Marathopolis, erected since 1860, stands on the low, rocky point of Marathon; from the point a sandy spit extends 400 yards in a westerly direction, with  $4\frac{1}{2}$  fathoms water on its edge, leaving a passage about the same breadth between it and a five-fathom rocky shoal, lying a quarter of a mile off the NE. part of the island; elsewhere, from

the extremity of the spit towards the island, the depth is six to 10 fathoms.

Coasting vessels during summer usually anchor to the SW. of the village, in seven fathoms water, and load with currants, the principal produce of the district. During southwesterly gales a heavy sea runs through the channel.

**Sikia Channel.**—At seven miles southward of Proti island is the Sikia channel, the N. passage into Navarino bay; the coast between is low, rocky, with sandy bays, and bordered by shoal water, with cultivated plains within. Sikia channel was choked with vessels and stones in 1571 to protect the Turkish galleys that escaped from Lepanto, and has now only two feet water.

On a conical hill, at half a mile N. of the channel, is Paleo Avarino (ancient *Pylos*), the remains of a large castle, 450 feet above the sea, having on its N. and E. sides perpendicular cliffs; it was once the residence of Nestor, and in the face of the cliff on the N. is a large cave, which bears his name.

Beneath the castle on the N. is a small circular inlet, called port Voithio Kilia; it is used only by fishing boats, and is filling up with sand. The port is separated from the extensive marsh of Dagh on the E. by a narrow neck of sand.

**Kumatodes Reef.**—The W. coast of Sphaghia island is high, and towards the S. end composed of steep whitish cliffs; its central part is irregular with rocky projections, and bordered all along by rocks. At 1,800 yards southward of the NW. extreme of the island, and about 300 yards from the shore, is the Kumatodes reef, with three fathoms water on it; this part of the island should not be approached.

**NAVARIN BAY.**—This extensive bay is fronted by the island of Sphaghia (ancient *Sphacteria*), which is more than  $2\frac{1}{2}$  miles in length, N. and S., with an average breadth of less than half a mile, and at its N. end 514 feet high. The bay is thus sheltered from all westerly winds and sea, and forms the most capacious harbor in the Morea.

At a quarter of a mile from the S. end of Sphaghia is the rocky islet of Pylos, 114 feet high, with two smaller islets on its N. side; between the latter and the S. end of Sphaghia is a narrow but deep channel, which with a commanding breeze or under steam may be used by moderate-sized vessels. One of the Pylos islets is remarkable, being perforated, the hole appearing like a majestic triumphal arch.

The S. entrance, between Pylos islet and the mainland, is less than three-quarters of a mile wide, and free from danger; but a rocky bank extending from the coast on the S. side of the entrance should be avoided; the bank has  $4\frac{1}{2}$  fathoms water on it at 200 yards from the



shore. After a continuation of northerly winds a current sets out of the harbor, which, with baffling winds, at times renders it difficult of access in a sailing vessel.

Within, the bay opens out to two miles in breadth, with depths varying from 28 to 10 fathoms; the eastern shore for some distance is rocky, bordered by shoal water, and should not be approached too close or nearer than nine fathoms, as it shoals suddenly, and off the town are patches of  $2\frac{1}{2}$  and three fathoms, at 400 and 500 yards from the shore. To avoid these patches, do not bring the church above the town eastward of the trees in the square.

The shore of Sphaghia island is rocky and steep-to; the head of the bay is sandy, and within the shore are extensive lagoons and marshes; the eastern land is well cultivated, rising in undulating ridges, with the rivers Jalova and Xerias and other streams running through the valleys to the sea; the water all round the eastern shore continues shoal.

**Kuloneski Islet** or Marathonisi, is about 200 yards in length, 25 feet high, rocky, surrounded by shoal water, and lies in the middle of the upper part of the bay. To the eastward of the islet are the remains of sunken vessels.

**Sphaghia Shoal.**—This rocky shoal, about 300 yards in diameter, with three and four fathoms on it, lies in the NW. part of the harbor, and the shoalest part is 800 yards from Sphaghia island. The bridge over the river Xerias in range with the S. end of Kuloneski islet leads southward of the shoal.

A rocky patch, with eight fathoms water on it, lies nearly midway just within the entrance of the harbor.

**Navarin or Neo-Kastro.**—This town, containing about 2,300 inhabitants, is prettily situated in a valley on the S. side of the bay; the houses are clean, and there is a post-office, custom-house, quarantine-office, and electric telegraph, but little or no trade. The postal communication to Patras, Athens, Mothoni, and Kalamata is performed on horseback three times a week.

The fortress on the E. side of entrance, and about 180 feet above the sea, was formerly strong, but is now almost dismantled; a few guns only are mounted, and there is a garrison of about 150 men.

**Supplies.**—The town and fortress are supplied with water from an aqueduct, which winds round the eastern hills up the first valley to the N.; but shipping can obtain only small quantities from a fountain in the square. To the S. are the remains of another aqueduct now totally destroyed. Excellent water, however, can be obtained at the anchorage in the N. part of the bay, from the river Jalova, as well as from springs.

Provisions are not very plentiful; mutton and beef of an inferior quality can be obtained in small quantities.

**Anchorage.**—During the summer months, vessels usually anchor a long half mile northward of the town, being careful not to approach the eastern shore into a less depth than 10 fathoms, as the water shoals suddenly. Small vessels anchor closer in off a small mole.

In winter, vessels anchor northward of Kuloneski islet, in 10 to 13 fathoms, off a large white building close to the beach near the watering place. There is less swell here than off the town, and the squalls in SW. and NW. gales, particularly the latter, are less heavy; it is also more convenient for getting to sea; the water is of less depth than generally off the town, and the space is limited for the large number of vessels which at times put in here for shelter.

**LIGHT.**—On Pylos islet, at the N. side of entrance to Navarin bay, is a stone tower which exhibits, at 116 feet above the sea, a *fixed red* light, visible five miles.

**Mountains.**—At about 12 miles northward of the entrance to Navarin bay, mount Agia rises 3,957 feet above the sea, the summits N. and S. being of much less elevation; farther S. is a cut in the mountain; and at eight miles eastward of Navarin is the remarkable conical peak of mount Lykodemos, 3,132 feet high, with all the heights to the southward much lower. These elevated mountains will be seen at a long distance from the westward, and on a near approach to the land, mount St. Nikolo, a remarkable sharp peak, 1,542 feet high, with a white church below the summit on the S. side, rises from the coast immediately S. of the entrance to Navarin bay; Paleo Avarino, the ruined fortress on the N.; Navarin fortress; and the steep whitish cliffs of the S. part of Sphaghia island, and Pylos islet, will indicate the entrance to Navarin bay.

**Pylos Shoals.**—At  $1\frac{1}{2}$  miles S. by W.  $\frac{1}{4}$  W. from Pylos islet, and 1,300 yards WSW. from St. Nikolo rocks, is a rocky bank about 200 yards in diameter, with six fathoms water on it; and about a third of a mile to the SW. is another bank, also with six fathoms on it; the water between and around the two banks is deep; they lie 1,300 yards and  $1\frac{1}{6}$  miles respectively from the coast, and are called the Pylos shoals. The W. side of Kuloneski islet, in Navarin bay, in range with the E. side of Pylos islet, leads in the direction of the shoals. Vessels should avoid these banks, especially those of heavy draught; in strong winds the sea breaks heavily over them.

**MOTHONI or MODON** (ancient *Methone*) is  $5\frac{1}{2}$  miles southward of Pylos islet; at a mile from the islet, at the foot of mount St. Nikolo, is a small projection with rocks above water, the latter close to, and of the same name. To the S. between Mothoni, and a mile N. of it, are the

islets or rocks of Kaliora (five feet high), Nisikoulia (60 feet high), and a smaller islet N. of it. The hills S. of mount St. Nikolo gradually decline in height towards Mothoni; the coast all along is rocky, steep-to, and the heavy westerly swell generally breaks on it.

Mothoni, once a town of much importance, is now only an indifferent village with about 1,000 inhabitants, but no trade. On a point of land projecting about a quarter of a mile to the S. is an extensive castle, an ancient Venetian fortress now in ruins, and without a single gun; it is united on the S. to a rocky islet, 53 feet above the sea, on which is a round tower. The shore on the W. side of the fortress and around the islet is rocky. The ancient port formed by a mole running parallel to the fortress wall is now filled with stones and sand, and the remains of the mole is level with the water; a marble pillar stands on a rock at the end of the mole, a short distance eastward of the fortress wall.

**Mothoni Channel**, which separates Sapienza island from the Morea, is 1,700 yards wide from point to point, but a ridge of very uneven ground and steep-to extends southward from Soukouli point or islet at the S. extreme of the castle, to within 300 yards of the island. The depths on this ridge vary from 10 to  $2\frac{1}{2}$  fathoms, the latter depth being 400 yards from Soukouli point, and at a third of a mile from Sapienza island there are  $4\frac{1}{2}$  fathoms. Between the tail of the ridge and Sapienza, the narrow channel is 11 fathoms deep.

From the castle a sandy shore curves round to the SE., forming a semi-circular bay, which terminates in steep white cliffs, and is all along bordered by shoal water, which extends off some distance.

At 1,400 yards SE. of the round tower of the castle, 1,000 yards from the S. extreme of the bay, and more than 400 yards from the shore, to which it is nearly connected by rocks awash, is San Benardi islet, 43 feet high, with sunken rocks nearly 200 yards outside it; the islet forms the eastern limit of the anchorage.

The usual anchorage is in the middle of the bay, eastward of the round tower, in seven fathoms water, sand, but it is seldom used, except for temporary shelter against strong NW. winds. The ridge before mentioned, protects it from the westward, but with SW. winds a heavy sea rolls in, and it would be unsafe. From the westward a large vessel should pass a short 200 yards northward of Sapienza, until the town of Mothoni is well open of the castle, and then steer for the middle of the bay.

Vessels entering Mothoni channel from the eastward, should keep in mid-channel or rather nearer Sapienza island than the mainland; on the island side there are five fathoms water, at 500 yards from the shore; and on the N. side the same depth is 600 yards from the S. point of the

bay, and the water shoals rapidly on either side within the depth of 10 fathoms. In passing out to the westward, keep a short 200 yards from the N. point of Sapienza as before. In moderate weather, the current sets through the channel to the westward, about a mile an hour.

**Kolivri Point**, two miles to the SE. of the white cliffs of Mothoni bay, is a small promontory 228 feet high, and appears like a round islet; it is skirted by rocks at the distance of a quarter of a mile, one of which is above water. The shoal water around Mothoni bay continues along the shore to Kolivri point.

**Sapienza Island** (ancient *Enussae*), lies 1,600 yards from the coast of Morea. It is  $3\frac{3}{4}$  miles in length N. and S., irregular in breadth, the widest part being about  $1\frac{1}{2}$  miles across; the northern part is 740 feet high, the hills to the southward gradually declining in height, and from the NW. the island appears triangular, sloping towards the S. At the NE. part of the island, an elevated spur projects to the eastward, which is bordered on the N. by shoal water which extends a distance of a quarter of a mile, making the Mothoni channel too narrow for large vessels. The W. coast is sinuous with scattered rocks along its southern part; and at the S. end of the island are some sharp, dark rocks, called Thio Adelphi; elsewhere the coast of the island is rocky and in general steep-to.

Port Longona, on the SE. side of the island, is fronted by an islet which should be left on the right hand in entering, together with a large rock, the passage N. of the islet being shoal; the port is only used by small vessels seeking shelter from NW. and southwesterly gales, the anchorage being in seven to 10 fathoms. The island is inhabited by shepherds only.

Santa Maria islet, nearly in the middle of the channel between Sapienza and Skitza island, is a long half mile in length, 100 feet high, with deep water in the channels on either side of it.

**Skitza Island** (ancient *Cabrera*), two miles to the SE. of Sapienza, is somewhat in the form of a rhomboid,  $3\frac{1}{2}$  miles in length,  $1\frac{1}{2}$  miles in breadth, and has a round hill near its N. end which is 644 feet high; with the exception of this hill, the island is generally flat, rocky and barren, with deep water nearly all round. Both the N. and S. points of the island are foul, and should not be approached too close.

Port Skizza, a small cove open to the SW., and used only by small coasting craft, has a rocky shoal at about a quarter of a mile from the shore on the S. side of entrance, with four fathoms water on it. The island affords pasturage for a few goats.

Arnatzi rock, about 800 yards from the E. side of Skitza island, is

black, about 30 feet high, with a sunken rock to the N. of it; the water near it is deep.

**CAPE GALLO** (ancient *Acritar*), is seven miles to the SE. of Kolivri point; the coast between forms a bay, and along the sandy beach on the N., there is anchorage with off-shore winds, in seven or eight fathoms water, sandy bottom. At three-quarters of a mile eastward of Kolivri point is a rock above water, with a sunken rock outside it; between these rocks and the point the water is shoal. On the slope of a hill near the eastern end of the beach are the remains of a Venetian tower.

From the NE. corner of the bay, the coast trends southward, it is at first rocky and then sand as far as cape Gallo, and backed by a ridge of moderate elevation. Cape Gallo is a steep rugged pinnacle, united to the mainland by a low neck.

**Venetico Island** (ancient *Thecanusi*) is about a mile in length N. and S., 570 feet high, and remarkable for its steep and broken appearance; its N. extreme is a low point of shingle, from which a shoal, with four and five fathoms water on it, extends half a mile to the NNE., when the water suddenly deepens. At the S. end of Venetico, rocks lie off the W. and E. extremes.

Vessels taking the passage between Venetico and cape Gallo, should keep near the cape, so as to avoid the shoal extending northward from the island.

A current at times sets through the passage at the rate of  $1\frac{1}{2}$  or two miles an hour, influenced by the force and direction of the winds.

**Petra Karavi** or **Avgo** are three rocks or islets lying a mile to the southward of Venetico island; the largest is about 30 feet high, with shoal ground extending 200 yards to the S.; the other two are much smaller, and to the N. of the former. Midway between these islets and Venetico there are 24 fathoms water, and at three-quarters of a mile eastward of them the water is 100 fathoms deep.

**GULF OF KALAMATA** (ancient *Sinus Asinaeus*), is formed between cape Gallo on the W. and cape Matapan on the E.; these capes are nearly SE. and NW. of each other, and about 35 miles apart, and from the parallel of cape Gallo, the gulf is 18 miles deep. The remarkable cone of mount Lykodemos, 3,132 feet high, rises about  $12\frac{1}{2}$  miles northward of cape Gallo, and its eastern slopes, with those of the chain of hills between, form the W. coast of the gulf; the northern shore is part of the fertile valley of Parnissus; and the eastern coast is that of the peninsula of Mani or Maina, which terminates on the S. in cape Matapan, and is backed by a chain of lofty mountains.

The most conspicuous of the mountains on the E. side of the gulf are

mount St. Elias or Makryno (ancient *Taygetum*), which rises 7,900 feet above the sea, on the parallel of  $36^{\circ} 56\frac{1}{2}'$  W. and about seven miles from the shore of the gulf, its summit being almost always covered with snow. Mount Kubenova, 10 miles to the S., with an elevation of 4,800 feet; mount Sanghia,  $14\frac{1}{2}$  miles N. of cape Matapan, 3,990 feet high; mount Mamotika, 10 miles N. of the cape, 3,520 feet high; and the hills between this latter mountain and the cape about 1,000 feet high.

The appearance of the western side of the gulf is very pleasing and also the valley and magnificent mountains in the interior on the N. Mani is equally remarkable for the wildness of its scenery; its mountains are sterile, precipitous, rent by volcanic convulsions, and almost without vegetation. The 60,000 Maniotes who inhabit this country appear to have taken the impress of its natural features: they are wild, fierce lovers of freedom, and jealous of their independence, which they have maintained from all antiquity; the ruling of these people causes much trouble to the national government; the Maniote is, however, sober, stern, and holds the rights of hospitality sacred.

In clear weather the lofty mountains may be sighted at a great distance; mount St. Elias is, however, nearly always enveloped in clouds, and should the weather be clear, except in the direction of that mountain, it may be assured that under that cloud is mount St. Elias. With SE. winds, these mountains are covered with clouds and the lower parts only are seen, and it would therefore be well to gain practical knowledge of their outline.

In the gulf there are no special hinderances to navigation, the sea is deep, and the coasts may be approached at discretion. The winds which blow out of the gulf are at times of great force. In ordinary weather the winds blow from the gulf during the night, and from seaward during the middle of the day. The weather is subject to sudden changes, especially during autumn and winter, when the wind will shift in a few minutes from SE. to NE., blow furiously for a few hours, and then back round to its original quarter. Violent squalls, accompanied by thunder, lightning, and heavy rain, are frequent during the winter season.

Southerly winds seldom blow home, but a tremendous heavy swell rolls into the gulf; in strong southerly gales, vessels seek the anchorage at Petalidi on the western, and Armyro and Kitries on the eastern side of the gulf.

The river Pynratza runs into the sea through the plain at the head of the gulf; where also several small rivulets empty, but these are dry in the summer.

**Koroni.**—The castle of Koroni (ancient *Colonides*), six miles to the NE. of cape Gallo, stands on an elevated plateau, on a rocky tongue of

land projecting a mile to the eastward ; the castle bears evidence of once being a fortress of great strength, as its embattled walls, massive round towers, subterranean passages, now in ruins, are visible in every direction.

The little town of Koroni extends along the shore, on the NW. side of the castle, and contains about 2,000 inhabitants; it has a fair trade in olives, oil, fruit and excellent wine. A small mole projects from the town about 200 yards to the NNE., which affords shelter to small craft from SE. winds; the anchorage for large vessels is a mile off-shore, in eight to 10 fathoms water, mud bottom. When coming from the southward a fair berth should be given to Lividia point, as a strong current at times sweeps round it. The shore along by the town is rocky, and at the point half a mile to the NW. of the mole, rocks extend off nearly a quarter of a mile; small vessels intending an in-shore berth, should not anchor westward of the town. This is an excellent anchorage during a southerly or southwesterly gale.

With NE. or gulf winds, which at times blow with great force, there is good anchorage in the sandy bay, to the SW. of the castle, at about half a mile from the shore, in nine or 10 fathoms.

A road along the shore leads from Koroni, through Petalidi, to Kalamata.

**Petalidi.**—From Koroni, the coast trends N. 10 miles to Petalidi, and is skirted here and there by rocks; at about two miles from Koroni there is good anchorage, a mile from the shore, in 10 to 12 fathoms, bottom mud and sand. In the vicinity, excellent fresh water runs into the sea, and there are two or three villages whose inhabitants are very poor. The land is well cultivated with the vine, and extensive plantations of olive trees cover the slopes of Lykodemos.

The village of Petalidi (ancient *Corone*), at the foot of mount Lykodemos, is built on the shore of a small shallow bay open to the NE., and formed by a low point, projecting from which are the remains of an ancient mole, which, with some rocks, reach nearly 400 yards from the point. The bay is sheltered from all winds but those from the SE., which seldom blow home. Coasting vessels anchor in shoal water, sheltered by the mole, and remain for the winter; larger vessels anchor northward of the point, and a long half mile from the shore, in six or seven fathoms. The bay will be known by a white church on the point. Water may be obtained from the river Ioannes, a mile northward of Petalidi.

The low shore of the extensive plain, which bounds the head of the gulf of Kalamata, commences northward of Petalidi, and trends eastward 10 miles; in the interior are the lofty mountains of Arcadia.

**Pyrnatza River** discharges about four miles to the NE. of Petalidi; the bar has but two feet water on it, and is dangerous. The river abounds in fish, and particularly lobsters, which are of large size.

The village of Nisi, near the center of the bay, and on the bank of the Pyrnatza, about two miles from its mouth, carries on a considerable trade, the produce from the interior being all brought here, carried down the river in boats, and shipped on board vessels at anchor off the river's mouth. The produce is corn, oil, wine, currants in large quantities, potatoes and dried figs. The anchorage is in about eight fathoms.

**KALAMATA**, near the NE. corner, and from which the gulf takes its name, is at the foot of a little hill on which is the ancient acropolis of *Pharæ*, about 1,600 yards from the sea. The present town is of some extent, surrounded by vineyards and olive plantations, with the broad bed of the Nedone, a mountain stream, passing close to the westward; it is about  $1\frac{1}{2}$  miles from the beach, contains 6,500 inhabitants, carries on a brisk trade, has regular communication with Athens three times a week, and there is an electric telegraph. Consular agents of different nations reside here. The custom-house is near the beach. Greek steamers call here regularly. Provisions of all kinds may be obtained.

The exports are figs, currants, oil, cocoons, lemons, fish, wine and spirits; the imports are manufactures, iron, wood, copper, sugar and wheat. Estimated value of the exports in 1875 was about 284,000*l.*; and of the imports 191,250*l.*

The beach is steep-to, and the water a short distance off deep; the usual anchorage is off the custom-house, in 12 fathoms, sandy bottom, half a mile from the shore. The roadstead will be known by the castle, or acropolis, which appears above the trees, and on a near approach the houses on the beach will be seen.

**Water.**—There is no water at the scala, but from a lagoon formed by the Pyrnatza river, about  $4\frac{1}{2}$  miles to the westward, and separated from the sea by a sandy neck 40 yards across, a supply may be obtained. The water near the sandy neck is deep, and boats can be loaded or pumped into with facility.

**Armyro Bay.**—In winter, or threatening appearance of the weather from SSE., vessels should leave Kalamata roadstead for Armyro bay, two miles to the ESE., and anchor near the E. coast under very high land, 600 yards from the shore, in 10 fathoms, somewhat sheltered by cape Kitries, the most salient point of the E. coast of the gulf. Here vessels lie in safety, almost becalmed, as the wind does not blow home, though a very heavy swell sets in. Small vessels, such as brigs and schooners, frequently lie here all the winter. The wind from the NW.



blows furiously off the plain, but the water then is smooth. The village of Armyro consists of 25 or 30 houses.

**Kitries Bay.**—From the NE. corner of the gulf, where the low shore of the plain terminates, the coast which is all clear, with mountainous land behind it, trends southward to the anchorage of Armyro; and farther on, at about  $5\frac{1}{2}$  miles from the roadstead of Kalamata, is Kitries bay. Kitries bay is open to the NW., it is small, extends inwards about 1,200 yards, and is sheltered from the S. by cape Kitries; but being inconveniently deep, having 35 fathoms in the middle, with 18' to 20 fathoms at 100 yards from the shore, and exposed to the NW. winds which sweep over the plain of Kalamata with great force, it is seldom resorted to. Coasting vessels anchor close to the shore, and make fast to the natural rocks on the S. side of the bay; the holding ground is good.

The inhabitants of the little village near the shore are very poor. On account of the lofty mountains which rise in the vicinity of the bay, and calms during summer, the heat is excessive. A few ruins alone remain of Kitries, once the residence of the bey of the independent Maniotes.

**Cape Kitries**, immediately southward of the bay of the same name, is a bold round promontory, about 1,148 feet high, the most western point of the E. side of the gulf, clear of danger and steep-to; it is easily recognized and is conspicuous from the southward.

**The Coast** from cape Kitries trends to the SE. for three miles to cape Kurtissa, and then falls back to the NE., forming a bay about a mile deep, of which a little islet marks its eastern limit. The islet is close to the shore, with a chapel on its summit, and shelters an anchorage for small coasting craft. The village of Skardamoula, containing about 90 houses, may be seen on the slope of a hill, a spur of mount St. Elias, which with its white summit rises majestically to the NE., about eight miles from the shore of the bay.

At  $2\frac{1}{2}$  miles southward of the islet is Stupar point, a small projection surrounded by a reef at the distance of more than half a mile; on the reef and 600 yards from the shore is a submarine spring.

The rugged and barren coast continues southward for 10 miles farther, to the entrance of port Limeni; nearly midway is a projection named cape Trakhela. The land, in general, about port Limeni is high, mountainous, and barren. With strong winds from the SW. the sea beats heavily all along the coast.

**Port Limeni** is the best in the gulf of Kalamata; its entrance is open to the westward, 800 yards wide, from whence it extends eastward more than a mile, and widens by a curve in the shore southward to the houses of Limeni. In approaching the port, the water is very deep, but

inside there are from 10 to four fathoms. It is necessary to be properly moored, on the S. side of the port.

To the NE. of the port is the village of Vitylo, and on the S. the town of Tsimova.

**Port Mezapo.**—The coast from port Limeni continues southward for eight miles to port Mezapo; the intermediate shore forms three or four indentations or bays, all open to the W., and named Dyko, Spazari, and Artzi.

Port Mezapo is open to the NW., 1,200 yards wide at the entrance, and falls back 1,400 yards to the SE. The water is deep, there being from 30 to 20 fathoms. Vessels moor in the eastern angle of the port, near the houses of Mezapo. A rather high tongue of land forms the W. side of the bay and shelters it from the SW. quarter. The termination of the tongue is remarkable, being whitish, steep, level on the summit, and appearing almost like an islet with the ruins of a tower on it.

The village of Mani, containing about 100 houses, may be seen  $1\frac{1}{2}$  miles from the bay, it is built upon a level on the slope of Mount Mamotika, which rises to a height of 3,520 feet, and is a good guide. When coming from seaward, the land of cape Grosso, is also a mark for the port, and may be approached at discretion.

**Cape Grosso.**—At  $1\frac{1}{2}$  miles to the SW. of port Mezapo, is the N. extreme of a remarkable promontory, the sea face of which forms an outward curve for about four miles N. and S., under the name of cape Grosso; it is an elevated plateau, being 1,235 feet high, almost level, and rising steep from the sea. The scattered houses of Orias upon the table-land are marked by a great step or terrace on the S., formed by a land slide caused by an earthquake. The coast is of a reddish color, and steep-to, there being 150 fathoms water at the distance of a mile.

From the S. extreme of cape Grosso to cape Matapan, a distance of seven miles to the SE., the coast trends inwards, forming a semi-circle; at three miles northward of cape Matapan is a depression or saddle in the land, and here is the little port of Marmari, open to the westward, 600 yards wide, and falling back rather more than 600 yards to the eastward.

Small coasting craft anchor off an inlet on the S. side of the port. The port will be known by the saddle, and by an old tower on a little hill, on the N. of the entrance, and by another tower over port Kaio to the eastward, which is also conspicuous.

**Karavi Islet** or rock, three miles westward of port Marmari, is about 400 yards in diameter, and 40 feet high, with a shoal rock close to the N. extreme; at about 200 yards S. of Karavi, is the Kenesta rock,

nearly awash, and with some sunken rocks extending about 400 yards from the S. extreme. These rocks are much water worn; of a dark color, not always easy to distinguish, and their vicinity should be avoided at night. They lie about NW. by W.  $\frac{1}{2}$  W. four miles from cape Matapan, and  $2\frac{3}{4}$  miles from the S. extreme of the land forming cape Grosso.

**CAPE MATAPAN** (ancient *Tenarium*), is the termination of a peninsula three miles in length, joined to that of Mani on the N., by an isthmus only 600 yards in breadth, which separates the little ports of Marmari on the W., and Kaio on the E.; this peninsula is almost entirely of dark gray marble.

From the extremity of the cape, the land for  $1\frac{3}{4}$  miles rises regularly from S. to N. to a height of 1,020 feet, and then suddenly falls with a rapid descent towards the isthmus, and therefore when seen from the E. or W. at a distance of 12 miles or more appears isolated like an island and triangular in shape; but at a long distance to the westward, when the elevation immediately N. of the cape is below the horizon, mount Mamotika, 3,520 feet high, and 10 miles N. of the cape, will probably be seen, but its southern slope should not be taken for the high land of the cape, which on nearing will appear in sight.

Immediately southward of the cape its extremity cannot be recognized, on account of the high land within or to the N. of it, but on the W. are the steep cliffs of cape Grosso forming regular terraces, and on the E. the land nearest the cape also forms a terrace, and trends to the N.

The cape is within the visibility of the light on the N. end of Cerigo, clear of danger, and may be approached to within a prudent distance, there being 30 fathoms of water near it. The current in its vicinity generally sets to the westward at the rate of nearly a mile an hour. When under sail, with strong northerly winds, and near the coast, it is necessary to be prepared for the heavy squalls which blow from the high land in various directions.

**Port Azomato.**—This small anchorage is situated about a mile N. of cape Matapan; it affords good shelter from all winds except those between S. and SE. The hills round this port are not as high as those at port Vathy, and a vessel at anchor would not experience such heavy squalls as at that port.

**Port Vathy.**—This port, situated about a mile N. of port Azomato, is small, and should only be entered in cases of emergency or to seek shelter from a northerly gale.

The port is only open to winds from SE. to SSE., but the water is deep, and, as the surrounding hills are high, violent gusts of wind from all directions blow down the valleys between them.

The anchorage at the head of port Vathy is fairly good, but as the available space is only about 133 yards wide, a vessel would have to moor taut.

A marble quarry is situated near port Vathy but, as there is no communication with it by road, port Azomato would probably afford greater facilities for shipping the marble.

**GULF OF KOLOKYTHIA** (ancient *Laconicus*).—The base of the chain of mountains extending southward from mount St. Elias, with the peninsula of Mani or Maina, form the western coast of this gulf; and the base of the chain rising from the peninsula of Elos constitutes the eastern coast.

The S. end of the island of Cervi bears from cape Matapan E. by N., and the entrance between the two, is nearly 22 miles wide, the gulf thence extends northwards about 23 miles, narrowing to the shore of the valley of Eurotas at its head, to about eight miles.

The mountains of Mani have been already described in treating of the gulf of Kalamata; the base of which forming the W. coast of the gulf of Kolokythia, is rugged and irregular. The shore at the head of the gulf, is of alluvial soil brought down by the Eurotas, and the lofty mountains of Arcadia are seen at the head of the valley. The peninsula of Elos, with its arid and sterile mountains on the E., fitly corresponds with those of Mani on the W. At the NE. angle of the gulf, are the heights of Kourkola, 3,000 feet high; about  $1\frac{1}{2}$  miles from the shore, the chain continues southward to within four miles of cape Malea, where it terminates in mount Krithina, 2,600 above the sea. The principal port in the gulf is Marathonisi, in the NW. corner. There are no out-lying dangers, the water is deep, and the winds are similar to those in the gulf of Kalamata.

Port Kaio (ancient *Psamatus*), three miles from cape Matapan, is open to the eastward, 800 yards wide at the entrance, oval in form, and 1,600 yards deep; the head of the port is separated from port Marmari on the W. by the narrow isthmus before mentioned, and on a hill on the N. side of the port is an old tower or castle. The point on the N. side of entrance is broad and of a reddish color, and the port at a distance will be known by the break in the land forming the isthmus. Vessels may anchor here during westerly winds, but local knowledge is required, as an extensive shoal exists in the center of the port.

There is a depth of  $2\frac{1}{2}$  fathoms over this shoal.

**Kolokythia Bay** is ten miles northward of port Kaio, the coast between being high, rugged and barren, and the water deep close in shore. The bay is open to the southeastward,  $1\frac{1}{2}$  miles wide, falls back between high land a long mile to the NW., and being much exposed should not

be resorted to unless in case of necessity. A bluff promontory projecting to the SE. forms its NE. side, and the water in the center of the bay is deep. At about half a mile southward of the E. point of the entrance, is a shoal with four fathoms of water on it; close in by the point there are seven fathoms.

The little town which gave its name to the gulf, is in the NE. angle of the bay.

**Skutari Bay**, northward of Kolokythia bay, and separated from it by the bluff reddish promontory which terminates on the E. in cape Stavri, affords the best anchorage in the gulf. The entrance is open to the SE., two miles wide, thence the bay runs in to the NW. trending to the W. towards the head of the bay for nearly three miles, where there is a sandy beach. It is well sheltered from all quarters except from SE. and as the bottom is mud it is considered a secure anchorage.

Cape Paganía on the right side of entrance, is also a projecting promontory moderately high, round and bold, but not as elevated as cape Stavri. At the entrance of the bay there are 60 fathoms water, which gradually decreases, as at a mile from its head there are 18 fathoms, and below the town seven fathoms, mud bottom. The best anchorage, to be as much sheltered as possible from the SE., is on the SW. side of the bay.

The town of Skutari is on the slope of a hill, to the NW. There is no water to be obtained. Mani inland, though rugged, grows sufficient barley and beans to support its inhabitants, and silk is an article of exportation.

The coast to the N. of cape Paganía, is irregular and forms a semi-circular bay, with a chord of nearly six miles, caused by cape Paganía promontory, but it affords no shelter. A road through a deep and tortuous gully in the mountains leads to the town of Tsimova, near port Limeni, in the gulf of Kalamata.

**Gythium**, formally Marathousi, has resumed the ancient name, and was the port of Sparta. This town stands on the shore at the foot of a hill six miles northward of cape Paganía, contains 2,000 inhabitants, and is the principal sea port of the district, of which Sparta, seven hours distant to the N., is the capital, where there is a telegraph station. It is sheltered from the S. by Cranæ islet which is about a quarter of a mile in length, E. and W., and is connected by shoal ground to the shore, 200 yards distant; on the islet is a small church built in the form of an ancient temple.

On a hill northward of the present town, are vestiges of the ancient town, and at about  $1\frac{1}{2}$  miles to the N. on a hill near the shore, are the ruins of the castle of Kaki Skala.

The anchorage is 600 yards N. of the islet, in 15 fathoms water, mud,

about the same distance off shore, and a long 200 yards from the edge of the coast bank; vessels may anchor nearer in according to size, farther out the water is deep; there is a small boat harbor.

The country here has but few resources; water may be obtained from a spring, half a mile NW. of the town.

**LIGHT.**—On Cranæ islet is an octagonal white tower, which exhibits at 98 feet above the sea, a light showing a white and *red flash* alternately every *minute*, and visible from a distance of 15 miles.

**Directions.**—Gythium or Marathonisi being in the NW. part of the gulf of Kolokythia, a vessel bound to that anchorage should be guided by the truncated peak of Xyli conspicuous on the E. side of the gulf; while the two promontories of capes Stavri and Paganía will be recognized on the W., the former being the larger of the two; farther N. Mavrovouni, at times called monte Nero, a mile southward of the town, which has a village on it, will come in sight, having a reddish appearance. Cranæ islet should have a fair berth, and then anchor as above directed. In approaching the anchorage and the coast N. of it, do not stand close in, without attention to the lead. When coming from Cervi channel, mount St. Elias will be nearly in a line with the anchorage.

**Trinisi** is the name given three small black islets or rocks  $2\frac{1}{2}$  miles to the NE. of Gythium; they extend 700 yards from the shore, to which they are connected and to each other by shoal water, and they shelter an anchorage for coasting vessels.

**Iris or Vasili River** (ancient *Eurotas*).—From near the Trinisi, a low marshy shore tends eastward  $7\frac{1}{2}$  miles to the base of mount Kourkola, forming the head of the gulf. The Eurotas river runs through the valley into the sea by several mouths, the principal being three miles eastward of the Trinisi; on the bar of the river there is but little water, but within it is navigable some miles for flat-bottom boats. The valley in the interior is richly cultivated. The shore all along should not be approached within the distance of a mile and attention should be given to the lead.

**Mount Kourkola.**—At the NE. angle of the gulf, where the low shore terminates, mount Kourkola rises 3,000 feet above the sea, and is easily distinguished from all other heights in its vicinity; on the shore at its base is a red tower, named Kokina. At a mile westward of the tower there is an anchorage in 10 fathoms water, but it is exposed to the S. and SW. The coast from the tower trends southward nearly eight miles, to cape Xyli; it is high, and there are two or three islets or rocks close in by the shore, but it is all clear at a short distance off.

**Xyli Bay** is open to the SW. and formed by the two converging points of Xyli and Arkhangelo, which are  $2\frac{3}{4}$  miles apart; each point

covers a separate anchorage. Xyli bay on the N. is sheltered from the westward by a promontory projecting two miles to the S. and from which mount Xyli rises to a height of 1,040 feet. The mount when seen from the southward appears isolated like an island and in the form of a truncated cone, and the white rocks on its summit, at a distance of 20 miles, seem almost like the ruins of a castle; but when seen from the westward its appearance is changed; the land on its S. side is comparatively low and forms a round head like an islet, which is joined by an isthmus to the base of the mount, and is named cape Xyli.

The head of Xyli bay is called port Arasma, and is bordered by rocky shoal water, the depth of five fathoms being nearly a quarter of a mile from the shore. A small mountain stream here runs into the sea. A lane of deep water runs into the bay at the entrance. In entering give cape Xyli a fair berth, steer in and anchor on the western shore with the mount bearing about W.  $\frac{1}{4}$  N. in from 18 to 12 fathoms, sand. The rugged summit of mount Kimatisa, at less than two miles from the NE. shore of the bay, reaches a height of 1,500 feet; the base of this mountain with the high land on its S. forms the eastern shore, which is skirted all around by rocks and shoal water, and should have a wide berth.

**Arkhangelo Bay**, about four miles from port Arasma, is semi-circular, about three-quarters of a mile wide, and open to the NW.; it is sheltered from the SW. by a tongue of land, with a hill on its extremity, which projects about a half a mile to the NW. A little church and some houses serve to mark a cove at the head of the bay, fit for small coasting craft. A round hill, 853 feet high, rises from the SE. shore of the bay. The water in the bay is deep, at about 400 yards from the shore there being 18 fathoms.

During heavy rains several streams discharge into the sea between the two bays, but in summer they are usually dry.

**Coast.**—From cape Arkhangelo the coast continues southward for eight miles, to the entrance of the narrow channel between Cervi island and the mainland. At  $1\frac{1}{2}$  miles from the cape is the bluff point of Lyriotiki, with a round tower on it, and between are three islets or rocks near the shore, and shallow water extending off a third of a mile. Farther S. are the Klaro islets, to the NE. of which coasters find shelter. At three miles beyond the islets is the small projecting point of Koulendi, with a tower on it; the shore now becomes lower, and three miles farther to the S. is the channel separating Cervi from the mainland.

**Cervi Island or Elaphonisi** is triangular in form, each side measuring about three miles; the hills are of moderate elevation, that in the center being 900 feet high; it is barren, uncultivated, and destitute of water. The NW. side of the island is sinuous, and bordered by shoal

water, extending in places nearly half a mile from the shore, and on which are several islets and rocks, named Poriki; this side of the island should not be approached too near.

The S. side of the island, between cape Santa Maria and Frango point, forms a semi-circular bay about a mile deep, named Saraceniko. The head of the bay is shoal, and at the E. side of it is a round projecting headland having the appearance of an island, but which is connected to the shore on the NE. by a low sandy neck. A vessel requiring immediate shelter from northerly or NE. winds may anchor here off the beach, in eight to 15 fathoms water, but the holding ground is uncertain, and Vatika bay is a better anchorage.

Cape Santa Maria should not be rounded too closely, as a shoal extends 200 yards from it. Frango point is cliffy, clear of danger, steep-to, and may be approached at discretion; but the round headland to the NW. is bordered by a shoal, which extends off more than 100 yards; between the two is the little bay of Frango. From Frango point, the E. coast of the island, which is irregular, trends N.  $3\frac{1}{2}$  miles, terminating in a low tongue.

The N. end of Cervi is low, sandy, with rocky projections and surrounded by shoal water; it is separated from Petri islet and the sandy points of the mainland on the N., which are also bordered by shoals, by a tortuous channel about 100 yards in breadth, carrying about six feet water, and only fit for boats; the current sets strong through the channel. Cervi was once connected to the mainland, the channel which now separates it being then an isthmus.

**VATIKI BAY** (ancient *Sinus Beaticus*), formed between Cervi island on the W. and the coast of Morea, distant  $3\frac{1}{2}$  miles on the E., is open to the S., is about  $4\frac{1}{2}$  miles deep, and semi-circular at its head; it is surrounded by an amphitheater of hills, the most lofty peak to the northward being mount Aspro, at the foot of which is cultivated land, while on the E. a chain of heights extends southward to the sea. The bay is frequented by vessels encountering strong adverse winds, and unable to round cape Malea; with southerly winds a heavy sea sets in, but these winds always give sufficient warning of its approach to enable vessels to clear the bay.

Petri islet, in the NW. angle of the bay, and on the N. side of entrance to the boat channel between Cervi island and the mainland, contains many specimens of petrifications of small branches of trees, and oyster shells, in every stage of change from the original state to solid stone. There is a village on the site of an ancient town on the E. shore of the bay, but little in the shape of refreshments can be obtained; the town of



Gliki, the largest, will be seen halfway up the mountain. The swampy plain at the head of the bay abounds with hares.

**The Anchorage** is at the head of the bay, a long half mile from the shore, in 10 or 12 fathoms water, sandy bottom, with Petri islet bearing about W.  $\frac{1}{4}$  S. distant one mile; or if necessary a little farther out. The bottom on the E. side of the bay is uncertain, being in places rocky.

Vatiki bay is also a good stopping place in a westerly or southwesterly gale, and even as far round as SSW. It is stated by the natives, that the best anchorage then is about a quarter of a mile eastward of Petri islet, for here the sea forced through the channel between Cervi and the mainland is met by the current setting in the opposite direction, reducing its effect to a swell only. In this position vessels are said to ride easy at their anchors, and though temporary anchorage may be sought off the little bay on the E. side of Cervi, that near Petri islet appears more desirable, for although squalls may reach the vessel, the cables have not an undue strain on them, and the country people go so far as to say, that it is safe in any wind. To the eastward of this anchorage, the sea breaks heavily.

**Directions.**—Vessels may round cape Malea or St. Angelo at any convenient distance, as the water is deep close-to, but it is advisable with northerly or NE. winds, when under sail, to give it a fair berth in order to avoid the light winds, calms, and heavy squalls, which occur under the high land. At night the revolving light on the N. end of Cerigo, will be a guide through the Cervi channel. There is no danger in entering Vatika bay, as the shore on either side may be approached to the distance of a short half mile.

In bad weather, or before a northerly gale, mount Krithina, rising four miles to the NW. of cape Malea, is always shrouded by dense masses of clouds, which twirl and roll down the sides of the mountain with great velocity; the wind follows quickly and with great force. Vessels therefore that have to bear-up from the archipelago, especially at night, should be under easy sail so as to enable them to beat into Vatika bay, without having to shorten sail to the squalls which blow down from the high land.

In rounding the cape from the westward, with the wind northward of W., in all probability a N. or NE. wind will be blowing in the Archipelago.

**CAPE MALEA or St. ANGELO.**—The eastern shore of Vatik bay is irregular and bordered by rocks and shoals; in passing near St. Elia point the E. extreme of the bay, the white sandy bottom with black rocks can at times be distinguished; at half a mile to the SE. of the point, is a rock with shoal water around it extending 400 yards

from the shore, and a mile beyond it is the little chapel of St. Elia; thence the coast which is high, forming an indentation, trends eastward four miles to cape Malea or St. Angelo. At about half a mile from the cape, and 330 feet up the hill, is the dwelling of a hermit, who generally gives a salutation to vessels passing near. In exchanging colors, he shows a white flag with a black St. George's cross.

Cape Malea or St. Angelo, the SE. extreme of the Morea, is the termination of Elos peninsula, and forms a high, bold, round headland, rising from the deep water of the dark sea, to a height of 1,970 feet; it is clear of danger, steep-to, with 25 to 30 fathoms not far from it.

**Current.**—The current in the vicinity of cape Malea, generally sets to the westward at the rate of a mile an hour, but its strength and direction vary with the wind. Sailing vessels entering the Archipelago, should not close the land of the cape with the view of avoiding the current, as the chance of a steady breeze will be more favorable in the offing.

It is proposed to establish a light on the E. part of cape Malea in latitude  $36^{\circ} 26' 40''$  N., longitude  $23^{\circ} 12' 15''$  E.

**CERIGO ISLAND.**—This island (ancient *Kythera*), is 16 miles in length, N. and S., an irregular oval in form, of about 10 miles in breadth, and equal to about 80 square miles. It is mountainous, arid, and of volcanic formation, the greatest elevation being on the NE. side, which is 1,660 feet; while that on the SW. is 1,650 feet. There are several caves, the two principal of which are the beautiful stalactite grottoes of Santa Sofia and Mylopotamo; the caves are noted for porphyry. The coasts of the island are high, scarped, with small off-lying islets here and there, with deep water around, and the W. and SW. sides are irregular.

The climate is temperate and healthful, but the island lying between two seas, is liable to violent whirlwinds, which often cause considerable destruction to vegetation, destroying trees and vineyards. Sheep and goats find pasture in the mountains; the produce of the valleys are grapes, wine, oil, melons, figs, fruit, hemp, cotton and honey, all of which are exported. Cereals are grown for home consumption; great numbers of hares, rabbits, and turtle doves are caught; and in autumn, quantities of quails and other birds. The fisheries are productive and form a large item in the commerce of the island. The population is about 18,000. The principal town is Kapsali, at the S. end of the island; another town is St. Nikolo on the SE. side of the island. The roads on the island are good and lead to different districts.

**Cape Spathi**,  $4\frac{1}{2}$  miles southward of Cervi island, is composed of salient steep cliffs, 328 feet high, level on the summit, and gradually increasing in height to the southward; although the cape presents a

fine bold headland, it is foul all round at a distance of 600 yards. At  $1\frac{1}{2}$  miles westward of the cape is that of Karavougia, with a low level black islet surrounded by shoal rocky ground to the N. of it; the land between the two capes forms the N. end of Cerigo.

**LIGHT.**—On cape Spathi, 570 yards within the N. extreme of Cerigo, is a circular stone tower, which exhibits at 362 feet above the sea, a *fixed* white light, varied by a *flash* of *ten seconds* duration in each *minute*, and seen at a distance of 23 miles; beyond a distance of 12 miles the flashes only, are said to be seen. The light is visible through an arc of  $259^{\circ}$ , or when bearing from NE. by E.  $\frac{1}{2}$  E. easterly through S., and W. to NW.  $\frac{1}{2}$  N. northerly. This latter bearing leads over the Dragonera islet, and the E. end of Cerigo.

**West Coast.**—The W. coast of Cerigo is high, sinuous, and clear of off-lying hidden dangers; an islet lies here and there at half a mile to a mile from the land, but the water near them is deep. Vessels lying to under the lee of the island during strong northeasterly winds, should be under reduced sail, as heavy whirling squalls often blow from the high land. There is temporary anchorage a short mile southward of cape Karavougia, 1,200 yards from the shore, in 15 fathoms water.

From the cape, the coast southward is bold, iron bound, 700 to 800 feet high, skirted by straggling rocks, and with but few landing places. At about seven miles to the southward are the two Axini islets, the northern about 20 feet high, and to the ESE.  $\frac{3}{4}$  E. of it is a bay said to be visited by small vessels with southerly winds. At  $1\frac{1}{4}$  miles to the NE. of the islet, is an extensive ravine with perpendicular cliffs 300 feet high, and a rock or islet 40 feet high, at the entrance. Lindo islet, four miles farther southward, and half a mile from the shore is about 100 feet high, with its northern part nearly insulated at about one-third its length, and off its S. and W. sides are small detached rocks.

The coast hence to Kapsali bay is high, bold and cliffy, with numerous caves, and about two miles from the bay is a cove and landing place, exposed to the southward. The Strongilo are two conical rocks about 40 feet high, with detached rocks about them; they lie  $1\frac{1}{4}$  miles southward of Lindo, and  $2\frac{1}{2}$  miles beyond them to the SW. are the Grounia, two rocks five or six feet above water, with a patch of sunken rocks, a quarter of a mile eastward of them. The Grounia are  $1\frac{1}{4}$  miles to the NW. of cape Trakhili of Kapsali bay.

**Kapsali Bay**, at the S. end of Cerigo, is semicircular, about 1,400 yards wide, open to the southward, and falls back 1,400 yards to the N. In the NE. part of the bay, a small promontory separates two little coves; the one on the E., on the shore of which is the Lazaretto, is cir-

cular, shallow, and rocky, and its entrance only 55 yards wide; the other is much larger and used by coasting vessels.

Cape Trakhili, on the W. side of entrance, is the termination of a tongue of cliffy land projecting S. and SE., thus forming an arm which shelters the bay from SW. Cape Grosso, the name of which expresses its appearance, forms the right or eastern side of entrance, and the land around the bay is high, with a slightly irregular coast, and a shingle beach at its head. The water is everywhere deep, and from 25 fathoms, midway at the entrance, it gradually decreases to the head of the bay.

The town (ancient *Kythera*), generally called Cerigo, is on a hill at the NW. side of the bay, and contains about 1,800 inhabitants. In front of the town is a large fortress of Venetian architecture, about 590 feet high; it commands the town and bay, and is conspicuous from seaward. The Greek steam vessels, and those of the Austrian Lloyds, call here weekly.

From the westward, the town will be seen perched on the hill, and a white mill on cape Grosso, the only building in the vicinity, cannot be mistaken. The best anchorage is 400 yards to the S. by W.  $\frac{1}{4}$  W. of the light-house, in 16 fathoms, mud and sand. Small vessels moor under cover of the light-house point and opposite the houses of Kapsali. There are four fathoms near the point, and the water gradually shoals to the beach. The anchorage is safe with all off-shore winds; but it is exposed to those from the southward and SE., which send in a heavy sea, and although the bottom is mud and sand the anchors do not hold, and consequently it is not safe, except under favorable circumstances.

**LIGHT.**—On the western part of the little promontory, on the E. side at the head of the bay, is a white turret, from which, at 90 feet above the sea, is exhibited a *fixed* white light, visible at a distance of eight miles. The light is seen from the southward between the bearings of about NNW. and NE.  $\frac{1}{2}$  N., but is masked when in line with Ovo islet.

**Ovo Islet** (ancient *Epla*) is about 1,400 yards in length, N. and S., 550 feet high, and its bare rounded surface appears, as its name implies, like a large egg. The islet is steep-to, the water around it being very deep, and it lies  $1\frac{1}{2}$  miles southward of Kapsali bay, and serves as a mark for that anchorage.

**Kouphe Islets** are two islets or rocks, the larger of which is 33 feet high, flat, about 200 yards in diameter, and lies E.  $\frac{1}{4}$  S. distant  $2\frac{1}{4}$  miles from cape Kapela; the smaller islet lies SSE. 800 yards from the larger islet, and 400 yards off its S. side is a rock with  $1\frac{1}{2}$  fathoms water on it. With the exception of this  $1\frac{1}{2}$ -fathom rock, the Kouphe islets are clear, and the water around them deep, and in case of necessity a vessel with a commanding breeze may pass between them, where there are

50 fathoms; but during foggy weather or calms, caution is necessary as the currents are strong and irregular.

**Cape Capela**, two miles eastward of Cape Grosso, of Kapsali bay, is the SE. point of Cerigo; the high (about 300 feet) steep coast skirted by rocks, thence trends to the N. for six miles to St. Nikolo bay.

**St. Nikolo Bay**.—At the distance of six miles from Cape Kapela the coast trends round to the eastward for about  $1\frac{1}{2}$  miles and forms St. Nikolo bay, which is half a mile deep, and open to the S. and SE. There is anchorage here with all off-shore winds; but being exposed to those from the SE., vessels roll heavily, and wrecks have taken place when surprised with the wind from that quarter.

The SE. point of the bay is low, shelving, and surrounded by rocks at the distance of 200 yards; from the point, the land gradually rises N. to mount St. Giorgio, 1,000 feet high, and which has a small church near its summit. The mount slopes rapidly on its western side, and about half way down forms a counterscarp of reddish earth, which advances towards the sea, and forms part of the northern shore of the bay, which is somewhat elevated, with a castle or fortress on it.

To the westward of the castle the shore is beach and steep cliffs with scattered rocks, and here are the ruins of an ancient town and other remains.

The anchorage is about 800 yards southward of the castle, in 17 fathoms water, sand and mud; Dragonera island should be shut in with the SE. point of the bay.

**Port St. Nikolo**.—On the E. side of the castle is an inlet open to the SW., 300 yards deep, 100 yards wide at the entrance, where there are six fathoms water, widening within and forming an excellent little basin, with four fathoms. Here vessels moor in safety, and the port is the best in the island. The village is on the NW. side, and a good road leads to the town of Cerigo, 10 miles distant, or two hours drive.

Vessels that enter St. Nikolo bay are generally from the Archipelago; after having made Cape Malea and the most elevated part of Cerigo, 1,660 feet high, mount St. Giorgio a little to the SE. of it will be sighted, and on nearing the port the Dragonera islets, which should be left to the N. Mothoni point, the SE. extreme of the bay, is foul, and should not be rounded nearer than 300 or 400 yards, then anchor as before stated.

**Dragonera Islet**.—Dragonera islet is nearly oval in form, about 1,400 yards in length, E. and W., and 160 feet high, with gentle undulations. Near its eastern extreme is a rock above water and shoal ground beyond it; the sea breaks heavily here with northeasterly winds. The islet is 700 yards from the shore of Mothoni point, and is

connected to the mainland NW. of it by a bar with three and four fathoms water on it, the latter depth being nearly midway.

Anti Dragonera, 800 yards N. of Dragonera, lies parallel to it, and is somewhat smaller, being only 1,000 yards in length; it is clear on all sides, and separated from the mainland by a channel 400 yards wide, with 13 fathoms water, and which may always be used by keeping nearest to the islet in order to avoid the rocky point on the mainland within it.

These islands are covered with scanty grass and low scrub, affording pasturage for a few sheep and goats, but there is no water. From the eastward the southernmost island will be first seen; on a near approach the appearance of the two are very similar, both having a fall in the middle producing two hammocks.

There is temporary anchorage for small vessels between the two islets in from 11 to 20 fathoms water, with the advantage of three routes for leaving.

**North East Coast.**—From the Dragonera islets, the NE. coast of Cerigo trends to the NW. nearly straight to cape Spathi, a distance of  $11\frac{1}{2}$  miles; it is generally elevated land, with a few sandy spots, there are no off-lying dangers, and the water all along is deep. The islet of Makri, about 40 feet high, and 1,200 yards in extent, lies under the most elevated part of the island close to the shore, to which it is connected by shoal water (two feet), and about two miles from Anti Dragonera. The S. end of the islet is low, and a reef of rocks above water extends off about 100 yards; coasting vessels find shelter between the W. side of the islet and coast. On the SE. side of Makri is the smaller islet of Ophidi, with 10 fathoms water between the two islets.

At  $5\frac{1}{2}$  miles beyond Makri islet is the beach and village of Santa Panaghia, the scala or landing place of the town of Potamo in the interior. The island will be recognized from seaward by the village on the shore and a tower southward of it. Cape Spathi, the N. extreme of Cerigo, is  $3\frac{1}{2}$  miles farther to the NW.

**Cerigotto Island.**—At 17 miles SE.  $\frac{2}{3}$  S. from cape Kapela, is Cerigotto (ancient *Ægilia*), a narrow rocky island  $5\frac{1}{4}$  miles in length in a N. and S. direction, and in the middle about  $1\frac{1}{2}$  miles in breadth, gradually narrowing towards the extremes. The island is hilly and at about two miles from the S. end it is 1,230 feet high; it has a sterile aspect, the inner valleys are, however, cultivated. The coast is iron bound, with steep inaccessible cliffs, and not a grain of sand to be seen. The population is 350.

Cape Kephali, the N. extreme, is salient, of red cliffs 630 feet high, and steep-to; at about 800 yards to the WNW. of the cape, is the islet

or rock of Psira, 200 yards in diameter, with 19 fathoms water between. The W. coast of Cerigotto, is high, rugged, clear of danger, and the water deep close to. Camarella creek is a rocky inflection in the coast, and is at times used by boats with strong easterly winds.

Cape Apolitares, the S. extreme, is a table projecting point about 80 feet high, steep-to, and 16 miles from Agria Grabusa of Candia or Crete. The eastern coast is clear, but not so high as the western; there is a small bay on the SE. side, but the only port in the island is Potamo, about  $1\frac{1}{2}$  miles to the SE. of cape Kephali.

**Port Potamo** is open to the N., 600 yards wide at the entrance, and 1,000 yards deep; it extends southward between high iron-bound shores, narrowing at two inner points, within which it forms nearly an oval space about 400 yards N. and S. At the entrance the depth is 20 fathoms, in the inner part 10 to six fathoms. The village of Potamo is at the SW. part of the port, and a white fort stands on a hill on the SE. side. The E. point of entrance is high, round, of steep cliffs, and on it are the ruins of Paleo Kastro. At 300 yards off the NE. face of the point are the Thermoni islets or rocks, 30 feet above the sea, with shoal water extending southward, leaving a narrow passage, five fathoms deep, between them and the shore rocks.

With any sea at the entrance, vessels entering the port should carry sufficient sail to insure good steerage way; but with strong northerly winds a heavy dangerous swell sets in.

**Pori and Poretti Islets.**—To the NNW. of Cerigotto are the Pori and Poretti islets and dangers. Pori islet, the farthest from Cerigotto, is the larger of the two islets, being about 1,400 yards in length, E. and W., 410 feet high, steep-to, and lies N. by W. distant four miles from cape Kephali.

Vythi rock, with four fathoms on it, and deep water around, lies 1,600 yards N. of the W. end of Pori; the water is 40 fathoms deep between the two.

Poretti islet, nearly  $1\frac{1}{2}$  miles SW. by W.  $\frac{3}{4}$  W. from Pori islet, is about 400 yards in diameter, 130 feet high, cliffy on all sides, with a rock above water at its W. end, and steep-to all around; between the two islets there are from 40 to 48 fathoms water.

A singular horizontal mark seven feet above the water, and precisely the same all around Cerigotto, Pori, and Poretti, much resembling a high-water mark in places subject to regular tides, is worthy of notice. The rock being worn away to the depth of two inches, so uniformly straight and horizontal, attracts the eye in a moment. It is said, that in winter the water is at times higher than usual, but never near this mark.

**Nautilus Rock.**—This rock, on which an English sloop-of-war of this name was wrecked in 1807 with the loss of 58 of her crew, lies  $1\frac{1}{2}$  miles S. by E.  $\frac{1}{2}$  E. from Poretti, and three miles NW.  $\frac{3}{4}$  W. of cape Kephali of Cerigotto. The rock is 300 yards in extent E. and W., and in some parts nine or 10 feet above the sea, and from a distance has the appearance of scattered rocks, being much pointed and rugged; there is not a single detached rock, and the depth is from 20 to 30 fathoms within the distance of 100 yards.

At the E. end, where the *Nautilus* struck, and where her iron ballast was to be seen many years afterwards, is a shoal spot about 50 yards in extent. At one-third of a mile to the NE. is a rocky uneven bank about a mile in circuit, with from six to 12 fathoms water, and a small patch of  $3\frac{1}{2}$  fathoms; between the bank and the Nautilus rock there are 38 and 40 fathoms water.

**CHANNELS.**—Three channels lead from the Ionian to the Ægean sea, each named from the island N. of it. The Cervi channel, the northern, is the narrowest; Cerigo channel, the middle, is the most intricate; and Cerigotto channel, the southern, the widest and most clear.

**Cervi Channel**, although the narrowest, is the most direct for vessels from the westward, and is chosen in preference to the others, as it has the advantage of the light on cape Spathi, the N. end of Cerigo. With favorable winds, after passing Sapienza island and rounding cape Matapan, steer for the light, leaving it about two miles to the southward, and continue eastward, but in a sailing vessel not too close to cape Malea, on account of calms. This channel is much frequented, and many vessels pass through it daily. The state of the weather in the Archipelago may be obtained from passing vessels. In the Cervi channel it often happens that sailing vessels approach those from the Archipelago, each before the wind, when it is necessary to watch and consider which wind is likely to have the mastery. The channel is clear of danger, except cape Spathi, which should be avoided.

With northeasterly winds, work up under the lee of Cerigo, so as to avoid the current, and if necessary, lay by or anchor. Special attention is necessary to the rule of the road, in order to avoid collisions, particularly during the night.

**Cerigo Channel.**—Should a vessel, on account of unfavorable winds or other causes, be so far S. as to render it advisable to take this channel, Ovo islet, should be the guide. By day, with a fair wind, steer either side of Oro, and S. of Koupho islets, keeping in the steady breeze. At night pass southward of Ovo, and steer eastward, with the islet bearing W.  $\frac{1}{4}$  N.; when the high land at the E. end of Cerigo bears westward of N.  $\frac{3}{4}$  W., a vessel will be eastward of the Koupho islets, and may steer as



convenient. Cape Spathi light will open on a NW. by N. bearing. In working through this channel keep nearer Cerigo than Pori islet, and check the vessel's position by bearings of Ovo islet, Kapsali bay light, and the high land at the E. end of Cerigo.

**Cerigotto Channel**, between the island of this name and Candia or Crete, is the widest and without impediment. The Madara Vuna or White mountains of Candia, about 8,100 feet high, always capped with snow, are seen at a great distance. In taking this channel, vessels should keep Cerigotto island aboard.

**Winds.**—The prevailing winds in the Archipelago are from the northward between NW. and NE. The northerly winds commence early in June, and blow almost constantly until September; about the latter end of this month the winds become variable, with dark cloudy weather, succeeded by heavy rain, thunder and lightning; most of the rain falls during ESE. and SSE. winds, and sleet, snow, and rain falls in December, but the worst weather may be expected in January, February, and March. Generally about the latter end of March or beginning of April the winter breaks up, and fine summer weather commences.

In October and November southerly winds are most prevalent; these winds set in gently, acquire strength, blow strong for two or three days, and then shift with rain to the SW. and the weather becomes fine. It sometimes backs to the SE. and blows again, when it shifts, with hard rain and squalls, to the NW.; remaining in this quarter but a short time, it veers to the NE. and blows exceedingly hard. The SE. and SW. winds come on in heavy squalls, but they are not common, nor do they last. Westerly winds are generally fresh, with clear pleasant weather.

The winds from ENE. to ESE., at the entrance to the Archipelago, are steady in direction, and do not vary with the hours of the day like other winds.

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**TABLE OF POSITIONS AND INDEX.**

**COASTS AND ISLANDS MEDITERRANEAN SEA.**

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**PART IV.**



# TABLE OF POSITIONS.

## WEST COAST.

Place.	Particular spot.	Latitude, north.	Longitude, east.
		° ' "	° ' "
Cape Sta. Maria di Lenca	Light-house	39 47 43	18 22 17
Castro	Tower of the Castle	40 0 17	18 25 49
Otranto	Belfry	40 8 43	18 29 37
— cape	Light-house	40 6 23	18 30 37
San Cataldo point	Light-house	40 23 23	18 18 33
Pedagne rock	Light-tower	40 39 26	17 59 37
Penna point or cape Gallo	Light-tower	40 41 0	17 56 24
Vacito	Tower	40 42 53	17 48 10
Manopoli	Tower	49 57 9	17 18 15
Bari (St. Cataldo)	Light-tower	41 8 19	16 50 52
Molfetta	Belfry	41 12 21	16 36 3
Barietta	Light-house	41 20 0	16 18 40
Manfredonia	Light-house	41 37 38	15 55 34
Rossa point	Light-house	41 40 50	16 2 30
Vieste	Santa Croce light-house	41 53 17	16 11 13
Tremiti	Semaphore	42 7 15	15 30 32
Pelagosa island	Light-house	42 23 28	16 15 45
Pianosa islet	East end	42 13 40	15 45 20
Termoli	Large tower	42 0 9	14 59 56
Penna point	Church	42 10 8	14 43 6
Ortona	Light-house	42 19 45	14 24 30
Montepagano	Belfry	42 40 32	12 59 36
Colonnella	Old semaphore	42 51 49	13 54 2
Fermo	Cathedral	43 9 31	13 43 22
Civitavecchia	Tower	43 18 15	13 44 10
Potenza Picena	Tower	43 21 32	13 43 15
Montesanto	Tower	43 21 49	13 37 40
Recanati	Tower	43 25 59	13 40 10
Loretto	Cathedral	43 26 20	13 37 3
Mount Conero	Telegraph	43 33 20	13 36 32
Ancona	North mole head	43 37 43	13 30 27
Sinigaglia	Light-house at extremity of stone mole, east side of entrance.	43 43 40	13 13 30
Fano	Light-tower, east mole	43 51 20	13 0 50
Pesaro	Light-tower, east mole	43 55 19	12 54 51
Fiorenzuola	Belfry	43 56 56	12 49 44
Rimini	Main light-tower	44 4 16	12 34 54
Cervia	Belfry	44 15 28	12 21 33
Ravenna	Town tower	44 24 58	12 12 27
Corsini	Light-tower	44 29 17	12 17 5
Primaro	Semaphore	44 35 3	12 17 18
Goro	Light-tower	44 47 48	12 23 4
Chioggia	Belfry	45 12 57	12 16 46
Malamocco, port	Extremity of north mole	45 20 0	12 20 40
Venice	Belfry of San Marco	45 25 58	12 20 29
Piave Vecchia	Light-tower	45 28 38	12 33 9
Caorle	Belfry	45 35 53	12 53 32
Grado	Belfry	45 40 37	13 23 13

## EAST COAST.

Trieste	Sta. Teresa mole head	45 38 59	13 45 27
Salvora point	Light-house	45 29 26	13 29 34
Quarto, port	Dante point light-house	45 18 0	13 34 0
Rovigno	San Giovanni di Pelago islet light-house	45 2 10	13 36 40
Briuni islands	Light-house, south end	44 57 0	11 43 0

## TABLE OF POSITIONS.

## EAST COAST—Continued.

Place.	Particular spot.	Latitude, north.	Longitude east.
		° ' "	° ' "
Pola	Observatory	44 51 49	13 50 46
Cape Promontore	Cape Compare light-house	44 45 34	12 47 40
Port Rabas	Porter rock light-house	44 45 31	13 53 31
Fiume	St. Andrea point light-house	45 4 24	14 9 57
Porto Re	Marine Academy	45 19 35	14 26 43.6
Veglia island	Light-house	45 16 20	14 33 45
Segna or Zengg	Port Veglia mole head	45 1 30	14 34 36
Cherso island	Mari Art mole light-house	44 59 27	14 53 50
Arbe island	Kimen point light-house	44 57 38	14 23 30
Port Lussin Piccolo	Beacon	44 44 55	14 45 36
Port S. Pietro di Nembo island	Mortar island light-house	44 38 0	14 25 10
Prmuda island	Castle or fort	44 27 45	14 33 10
Grosaa island	S. Ciriaco chapel	44 20 15	14 35 44
Carlobago	Bianche point light-house	44 9 8	14 49 8
Port Zara	Mole head	44 31 30	15 4 24
Babac islet	Amica point light-house	44 7 52	15 12 18
Sestrice islet, port Tajar	Light-house	43 57 26	15 23 35
Lucietta islet	Light-house	43 51 14	15 12 8
Sobenico	Light-house	43 37 36	15 34 24
Mulo islet, Rogosenizza	Mole head	43 44 0	15 53 24
Lesina island	Light-house	43 30 55	15 51 6
Spalato	St. Giorgio point	43 7 30	17 12 0
Makarska	Cathedral	43 30 11	16 26 10
Pomo islet	Mole head	43 17 42	17 1 18
St. Andrea islet	Centre	43 5 28	15 27 30
Lissa	Summit	43 1 40	15 45 25
Curzola island	Hoate island light-house	43 4 30	16 12 20
Cape Gomona	Stonica point light-house	43 4 24	16 15 24
Lagosta island	Marina chapel	42 57 32	16 43 11
Port Tolero, Narenta river	Light-house	43 2 48	17 0 18
Meloda island, west end	Skrigeva point light-house	42 43 30	16 53 15
Port Slano	Velika Tatina	43 3 10	17 25 20
Port Gravosa	Cerna Seka, Port Palma	42 47 40	17 20 0
Ragnsa	Dolnji point	42 46 35	17 52 20
Gulf of Cattaro	Annunziata fort	42 40 0	18 5 0
Antivari road	Mole head	42 38 24	18 6 50
Durazzo	D'Ostro point light-house	42 23 30	18 32 0
Valona bay	Volovica point	41 5 18	19 4 31
Fano island	Light-house	41 18 32	19 27 18
Corfu	Saseno island light-house	40 30 7	19 16 30
Puxo, port Gayo	Light-house	39 51 40	19 26 50
Previsa	Flag-staff bastion	39 37 7	19 56 50
Santa Maura	Light-house	39 12 2	20 12 51
Port Drepano	Fort Nuovo minaret	38 56 30	20 45 40
Cephalonia, Argostoli	Castle flag-staff	38 50 19	20 43 44
Ithaca, port Vathi	Observatory islet	38 47 25	20 44 16
Zante	San Theodoro light-house	38 11 36	20 29 30
Patras	Lazaretto light-house	38 22 4	20 43 37
Cape Katakolon	Mole light-house	37 47 10	20 55 21
Navarin	Castle	38 14 47	21 44 47
Mothoni	Light-house	37 38 36	21 18 55
Koroni	Pratique flag-staff	36 54 32	21 41 50
Matapan, cape	Round tower	36 48 35	21 42 36
Xyli, cape	Mole	36 47 50	21 58 0
Cerigo, capo Spathi		36 22 45	22 29 35
Malea or St. Angelo, cape	Light-house	36 39 8	22 49 25
		36 22 50	22 57 30
		36 26 0	23 12 15

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